Metals Review
THE NEWS DIGEST MAGAZINE
Volume XXIII - No. 9 September, 1950

THREE WAYS TO REDUCE CLEANING COSTS!!

1. CONTINUOUS WIRE PATENTING—

Process wire which is free from scale can be patented in HOLDEN salt bath furnaces and salt baths without any scale formation. The wire can go directly from the take-up blocks with either your standard lime coating or borax coating, or with a new coating developed by us for subsequent drawing operations.

Equipment and materials covered by three issued U. S. Patents.

2. DESCALING—

A HOLDEN furnace at the exit end of your current oven furnaces into which the wire is quenched enables you to simultaneously descale the wire in continuous operation.

3. STAINLESS—

The annealing and descaling of Stainless 18-8 coils—either hot rolled or cold rolled—can be done using a high temperature salt bath for descaling and clean annealing, using a second furnace for hot quenching. On hot drawn material the reduced scale is completely removed by the normal passivating acids.

(NOTE: By the use of these three methods, acids can be eliminated except for bright finishing, and considerable of your waste disposal problems can be solved.)

THE A. F. HOLDEN COMPANY

P. O. Box 1898
New Haven 8, Conn.

11300 Schaefer Highway
Detroit 27, Michigan

Prepare now to enter the fifth

METALLOGRAPHIC EXHIBIT

to be held at the National Metal Congress and Exposition in Chicago, Oct. 23 to 27, 1950. Rules are simple and few; there are no restrictions as to size or method of mounting. A large area in the exhibition hall has been reserved so the entries can be displayed to best advantage.

RULES FOR ENTRANTS

Work which has appeared in previous Metallographic Exhibits held by the American Society for Metals is unacceptable.

Photographic prints shall be mounted on stiff cardboard, each on a separate mount. Each shall carry a label giving:

Name of metallographer
Classification of entry
Material, etchant, magnification
Any special information as desired

Transparencies or other items to be viewed by transmitted light must be mounted on light-tight boxes wired for plugging into an ordinary lighting circuit, and built so they can be fixed to the wall.

Exhibits must be delivered between Oct. 1 and Oct. 20, 1950, either by prepaid express, registered parcel post, or first-class letter mail.

Address: Metallographic Exhibit
c/o W. H. Eisenman
National Metal Congress and Exposition
International Amphitheater, Chicago, Ill.

CLASSIFICATION OF MICROS

1. Cast Irons and Cast Steels
2. Toolsteels (except Carbides)
3. Irons and Alloy Steels (excluding Stainless) in Wrought Condition
4. Stainless and Heat Resisting Steels and Alloys
5. Light Metals and Alloys
6. Heavy Nonferrous Metals and Alloys
7. Powder Metals (and Carbides) and Compacts
8. Weld Structures (including brazed and similar joints)
9. Series of Micros Showing Transitions or Changes During Processing
10. Surface Phenomena and Macrographs of Metallurgical Objects or Operations (2 to 10 diam.)
11. Results by Non-Optical or other Unconventional Techniques.

AWARDS AND OTHER INFORMATION

A committee of judges will be appointed by the Metal Congress management which will award a first prize (a medal and blue ribbon) to the best in each classification. Honorable Mentions will also be awarded to other photographs which, in the opinion of the judges, closely approach the winner in excellence.

A Grand Prize, in the form of an engrossed certificate, and a money award of $100 will be awarded the exhibitor whose work is adjudged "best in the show", and his exhibit shall become the property of the American Society for Metals for preservation and display in the Sauveur Room at the Society's Headquarters.

All other exhibits will be returned to owners by prepaid express or registered parcel post during the week of Oct. 29, 1950.

Entrants living outside the U. S. A. will do well to send their micrographs by first-class letter mail endorsed "May be opened for customs inspection before delivery to addressee".

32nd NATIONAL METAL CONGRESS AND EXPOSITION

October 23-27, 1950

Metals Review

THE NEWS DIGEST MAGAZINE

VOLUME XXIII, No. 9 **SEPTEMBER, 1950**

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CONTENTS

METAL SHOW ISSUE

DEPARTMENTS

ASM REVIEW OF METAL LITERATURE

HIGH PRODUCTION *in an* EMERGENCY

THE METAL INDUSTRY is awake to the need for increased production. It will meet the challenge as it has done in the past.

The 32nd Annual National Metal Congress and Exposition comes at a most appropriate time. At this all-important meeting of the top management, production and engineering talent in the industry, more than 30,000 will be in attendance.

If you haven't already planned to be in Chicago for the Metal Congress and Exposition—do so NOW! You will gain much by meeting people in the industry with similar problems—by seeing first hand what's new and improved to aid you in increasing your production.

This will be one of the most important meetings in the history of the metal industry. Top management men will be able to meet and talk to others—to compare notes, and to gather helpful information that would take weeks to secure in any other manner. And that goes for production men—department managers, supervisors, superintendents and foremen. All will be looking and listening—to get as much information as possible in a short space of time. And time is important right now. Engineers and metallurgists will be there to see what's new in equipment and processes, to examine and learn about structure and properties of new materials, that will fit into their operations and enable them to quickly step up production.

There will be about 400 firms displaying their products and services, with trained men in attendance to answer your questions and explain how they can help you achieve HIGH PRODUCTION.

Four great societies sponsor and participate in the Metal Congress and Exposition.

The American Welding Society will hold technical sessions at the Sherman Hotel, Monday through Friday.

The Institute of Metals Division of A.I.M.E. will hold technical sessions Monday, Tuesday and Wednesday at the Sheraton Hotel.

The Society for Non-Destructive Testing will hold technical sessions on Tuesday, Wednesday and Thursday at the Morrison Hotel.

The American Society for Metals has a full week —Saturday through Friday—of technical sessions to be held at the Palmer House. "High Production" Sessions will be held at The Amphitheatre. If you would like a complete program of the Metal Congress, write American Society for Metals, 7301 Euclid Avenue, Cleveland 3, Ohio.

Chicago is centrally located and within reach of the entire metal industry. Plan now to attend this great meeting. There are ample hotel accommodations—write Chicago Convention Bureau, Inc., 33 N. LaSalle Street, Chicago 2, Ill.

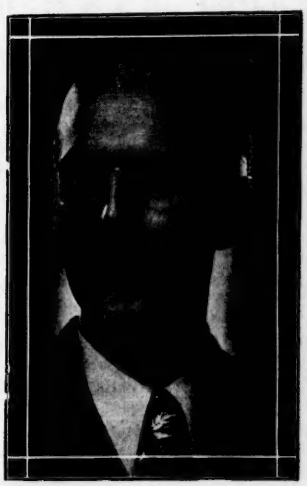
Attend the Metal Congress and Exposition and you'll take back information that will enable you to do your job better and help your company do its share in this emergency.

32nd NATIONAL METAL CONGRESS AND EXPOSITION

International Amphi... ...ago, Ill.

OCTOBER 23-27, 1950

AN INVITATION TO YOU



IN our present war and with the serious threat of even a more widespread conflict, high production is the principal contribution that our strategic metallurgical industries can make to the defense of our country. You know that this high production can only be obtained by taking full advantage of new methods, new materials and new equipment.

From past experience, you are well aware that the National Metal Congress and Exposition provides the best way to be sure that you are completely informed on all these new developments. This year, this event, the 32nd, will be held in Chicago from Oct. 23 to 27.

You are busy. So are all those who are participating by presenting their products and their technical knowledge at this congress and exposition. Only you, through your experience, can see fully how this information can be used to best advantage to make higher production possible for your product.

The officers of A.S.M. urge you to decide now to be with us in Chicago.

Walter E. Locke

PRESIDENT, AMERICAN SOCIETY FOR METALS

P. S. Bill Eisenman says that while most of the hotel rooms originally reserved for us have been assigned, Chicago is unusually well supplied with first class hotels and he has arranged for an additional number of rooms to be provided. For room reservations write to Chicago Convention Bureau, Inc., 33 North La Salle St., Chicago 2, Ill.

NATIONAL METAL CONGRESS WILL PROMOTE HIGH PRODUCTION

At the same time as the military forces of the United States are being strengthened in an effort to maintain a just peace, so also must the productive skills and techniques of the country be marshalled to sustain this effort. The vitally important metalworking industry will be assisted mightily in this effort by an event that will take place in Chicago the week of Oct. 23—namely, the 32nd National Metal Congress and Exposition.

The urgent need for increasing production in industry will form the underlying theme of the Congress and Exposition. The entire program is designed to pool the resources of the 350-some exhibiting firms and the 35,000 technical, engineering and production men who will participate in the Congress. Many and varied opportunities will be provided to help them organize and integrate their contributions toward the building of a national security force that will be equal to the challenge now facing the country.

In addition to the planned meetings and the tremendous display of products, processes and equipment, the Metal Congress and Exposition will provide an opportunity for top management and production men to meet and talk with others. Here they will be able to garner a harvest of information to help when materials and supplies get short. Here they will be able to see new things in equipment, processes and materials, and to learn new techniques and methods that will help step up production throughout the entire industry.

Four great societies sponsor and participate in the Metal Congress. They are the American Society for Metals, whose headquarters and most meetings will be at the Palmer House; the American Welding Society, at Hotel Sherman; the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, at Hotel Sheraton; and the Society for Non-Destructive Testing, at the Morrison. Each of these societies has a full program of meetings and events that will be open to those attending the Congress. Complete programs are given on pages 12 through 18.

The Exposition, in which more than 350 firms will have exhibits, most of them showing actual equipment, either on display or in operation, will be held at the International Amphitheatre, one of the country's most spacious and well-equipped industrial exhibit halls. Rapid and efficient special bus service will be provided to carry traffic between the downtown hotels and the hall.

The Metal Show will open at noon on Monday, Oct. 23, and the doors will close at 10:30 that night. Tuesday and Wednesday the hours are the same—noon until 10:30 p.m. On Thursday and Friday the Exposition will open at 10:00 a.m. and close again at 6:00 p.m.

Members of the cooperating societies will be given free entrance badges on presentation of their membership cards at the registration desks which will be maintained in the hotels and at the International Amphitheatre. Special invitations are also being issued by exhibiting firms. Registration fee without an invitation or a technical society membership card will be $1.00. An advance

registration form is provided on page 61 of this issue, which can be used to secure a badge by mail and thus save time at the registration desk.

The Exposition is under the general direction and sponsorship of the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. William H. Eisenman is managing director of the National Metal Congress and Exposition.

Seminar to Sales Clinic Runs Gantlet of A.S.M. Interests For Metal Show Program

With 31 separate meetings planned for the National Metal Congress and Exposition, the American Society for Metals will present a program running the gantlet of the varied interests appealing to the 20,000 metal engineers composing the Society's membership.

For the top level metal scientist the Seminar on Atom Movements and the traditional technical sessions will offer the latest developments in research and technology. For the student, three lecture courses will present the fundamentals of new and timely subjects. For the executives of the metal industry the program will include a Business Forum and a series of meetings on high production from management's standpoint. For the sales-minded, a special A.S.M. Sales Clinic is planned.

Through all of these meetings will run the recurring theme of high production for industry—new methods, techniques, equipment and materials, designed to save time and increase output.

The Seminar on Atom Movements opens the program, with four sessions on Saturday and Sunday, Oct. 21 and 22. During the succeeding five days, 11 technical sessions are scheduled on such topics as Surface Phenomena, Physical Metallurgy, High-Temperature Metallurgy, Heat Treatment, Fracture, Constitution of Alloys, and Plasticity.

The three lecture courses are scheduled for Monday, Tuesday and Wednesday afternoons and evenings. Subjects are "High-Temperature Properties of Metals", "Interpretation of Tests and Correlation With Service" and "Metallurgy of Titanium". The Sales Clinic will be held Sunday evening, Oct. 22, and the Business Forum on Thursday morning, Oct. 26. The Production Management meetings will be held on Monday, Tuesday, Wednesday and Thursday afternoons.

Headquarters for the American Society for Metals will be at the Palmer House. Members may register either here or at the International Amphitheatre, scene of the National Metal Exposition. All of the sessions and meetings will be held at the Palmer House with the exception of the Saturday sessions of the Seminar, which will be at the Stevens Hotel, and the Production Management meetings, at the Saddle & Sirloin Club, adjacent to the International Amphitheatre.

Other traditional events on the A.S.M. program are the annual meeting and Campbell Memorial Lecture on Wednesday morning and the annual banquet Thursday evening. Principal speaker for the banquet will be Zay Jeffries, recently retired as vice-president of General Electric Co., and a past president of the American Society for Metals. Presentation of the Society's various honors, medals and awards will also be made during the banquet.

Tickets are $7.50 and tables will seat ten. Advance reservations should be mailed to American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

At the International Amphitheatre, where the National Metal Exposition will be held concurrently with the Metal Congress, the American Society for Metals will sponsor the A.S.M. Metallographic Exhibit and a series of "Economy Theaters" where motion pictures will demonstrate industrial operations contributing to high productivity.

High Production to Be Looked at From Management's Viewpoint

Following the theme of high production for industry, which will underly all of the events of the National Metal Congress and Exposition in Chicago the week of Oct. 23, the American Society for Metals has planned a special series of meetings on "High Production From Management's Viewpoint". This series will supplement the Society's regular program of technical papers and educational lectures shown on page 12 and 13.

Speakers and chairmen for these unique and timely meetings will be technically trained industrial executives —men who can discuss broadly and authoritatively such factors as planning, materials, equipment and operations in various fields of metal fabrication.

Four meetings, scheduled for Monday, Tuesday, Wednesday and Thursday afternoons at 2:00 p.m., will constitute the series. They will all be held at the Saddle & Sirloin Club, conveniently adjacent to the International Amphitheatre, where high production methods and equipment can be seen in action at the National Metal Exposition.

The first three meetings will cover specific metalworking operations. Monday's meeting—first in the series—will be on "Fabrication of Nonferrous Metals". Harvey A. Anderson, engineer—raw materials, Western Electric Co., will act as chairman. Three speakers will discuss, respectively, casting, forming, and machining. They will each stress factors of planning, materials, equipment and operations.

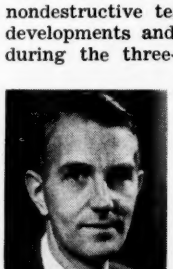
On Tuesday, "Forming of Metals (Hot and Cold)" will be the principal topic. Specifically, three men will speak on forging, stamping and drawing, and powder metal molding. Chairman of this session will be J. W. Armour, manager of manufacturing research, International Harvester Co.

"Cutting" is the general subject to be treated on Wednesday afternoon. Talks will be given on high cost of obsolescent machine tools, on cutting tools for high production, and on metals of maximum machinability. A. H. d'Arcambal, vice-president and consulting metallurgist, Pratt & Whitney Division, Niles-Bement-Pond Co., is chairman of Wednesday's meeting.

The fourth meeting on Thursday afternoon, Oct. 26, will be addressed by Emil F. Gibian, chief industrial engineer, Thompson Products, Inc., on the general subject of "Production Management".

Three Symposiums on Timely Subjects on S.N.D.T. Program

How radio-isotopes are being used as a new tool for nondestructive testing will be just one of many timely developments and problems that will be given attention during the three-day meeting of the Society for Non-Destructive Testing during the National Metal Congress in Chicago.



L. W. Ball

A symposium on radio-isotopes will be conducted by G. H. Tenney, U.S. Atomic Energy Commission, Los Alamos, on Tuesday afternoon, Oct. 24. This symposium, as well as all of the Society's meetings, will be held at the Morrison Hotel, headquarters for S.N.D.T. Meetings are scheduled for Tuesday, Wednesday and Thursday, Oct. 24, 25 and 26.

Two other symposiums are also scheduled on the program—one on Magnetic Particle Testing on Tuesday afternoon, and another on Ultrasonics on Wednesday evening. Since efficient and rapid methods of inspection

and testing are essential for high industrial output, it is anticipated that these meetings will tie in appropriately with the theme of the Metal Congress—namely "High Production in Industry".

Sessions are scheduled for morning, afternoon and evening on Tuesday, for afternoon and evening on Wednesday, and for Thursday morning. Thursday afternoon will be devoted to the Society's annual Honor Lecture (known as the Mehl Lecture) and to the annual business meeting. The Mehl Lecture will be presented by R. C. McMaster of Battelle Memorial Institute. The complete program appears on page 18.

Leslie W. Ball, chief, mechanical evaluation division, U.S. Naval Ordnance Laboratory, is president of the Society for Non-Destructive Testing. National headquarters are maintained at Skokie, Ill., where Philip D. Johnson officiates as secretary.

"Research in Progress" Reports Are Introduced by A.I.M.E.

A new idea is incorporated in the technical program of the Institute of Metals Division, American Institute of Mining and Metallurgical Engineers, planned for the National Metal Congress in Chicago. This is the inclusion of reports of "Research in Progress".

M. Gensamer

Such reports will form a part of several of the regular technical sessions, and a special session will be inaugurated as well. These "Research in Progress" reports are designed to bring to light research that is not yet far enough along to give any indication of final results or complete descriptions of methods, processes, or achievements.

The idea may well set a new pattern in technical discussions. The sessions should prove of benefit to many who have research projects under way similar in nature to those discussed at the meetings.

The Institute of Metals Division will concentrate its meetings during the first three days of the Metal Congress, namely, Monday, Tuesday and Wednesday, Oct. 23, 24 and 25. Headquarters will be at Hotel Sheraton. Registration fee is $2 for members and $4 for nonmembers; the fee includes a set of 30 preprints.

D. H. McLaughlin

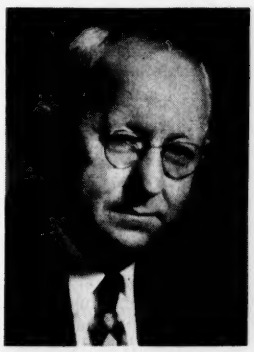
Another important feature of the program is the panel discussion on "Precipitation Hardening" on Monday evening. Moderator will be Morris Cohen of the department of metallurgy, Massachusetts Institute of Technology. The formal discussion will close at 9:00 p.m., when beer and pretzels will be served to add to the enjoyment of the evening as discussion of age hardening and other subjects continues on an informal basis.

The annual fall dinner and cocktail party will be held Tuesday evening, Oct. 24. Tickets are $5 each and may be obtained at the registration desk at the Sheraton Hotel. Complete tables of ten should be reserved by writing J. H. Reese, Revere Copper and Brass, Inc., 2200 North Natchez Ave., Chicago 35.

Donald H. McLaughlin, president of Homestake Mining Co., is president of the American Institute of Mining and Metallurgical Engineers, and Maxwell Gensamer, assistant to the director of research, Carnegie-Illinois Steel Corp., is chairman of the Institute of Metals Division. Ernest O. Kirkendall is secretary of the Metals Branch. Complete details of the program are published on page 17.

Welding Society Show Program Offers Two Types of Sessions

To serve American industry on a war basis the American Welding Society is deviating from its long-established technical program at the National Metal Congress by presenting two types of sessions during its 31st Annual Meeting at Hotel Sherman, Chicago, the week of October 22.



O. B. J. Fraser

The regular technical program will consist of about 70 papers in 16 sessions covering subjects of current interest. Many of the sessions will be devoted entirely to specific industries of military significance such as ship structure, aircraft, piping, machinery, railroad, pressure vessels and structures. Others will cover the latest developments and research in such processes as resistance welding, automatic welding, inert-gas shielded-arc welding and gas cutting.

A third group will be devoted to such general fields as weldability, surfacing, flame hardening, arcs and electrodes, controls, research, education, maintenance and non-ferrous welding.

In addition to these papers, the American Welding Society will present three symposiums on subjects of established importance to industry. One showing the economies resulting from good welding design and how it can be attained, will be held Tuesday afternoon, Oct. 24. This important subject was selected for two reasons: (a) the belief that welding and its allied processes offer significant opportunities for economies in production, and (b) that the designer of products is the key man to effect these economies.

At a special luncheon preceding the technical session the subject will be introduced by Convention Chairman H. R. Morrison. The principal speaker at the luncheon will be G. F. Nordenholt, Editor, *Product Engineering*. Following the luncheon three papers will be presented, as shown in the complete program on page 14.

On Tuesday evening, Oct. 24, another symposium on "Applied Welding Engineering" will demonstrate the proper application of welding processes. For this program the Technical Activities Committee of the Society has selected the actual production of three weldments to demonstrate the principles involved in the different welding processes. It will show that these principles apply to all structures no matter how large or how small.

The program will be presented as a slide film strip accompanied by comments by nationally recognized welding experts. Following the presentation an open discussion from the floor will take place. A complete transcription of the proceedings will be made for future distribution.

The third special session will be a panel discussion on Monday afternoon, Oct. 23, sponsored by the Resistance Welding Committee, to determine the needs of industry in this field of activity.

This meeting will include short talks on every metal and alloy commonly resistance welded, followed by general discussion from the floor. A transcription of the proceedings will be made and will be available for distribution.

Another special event of importance is the annual Educational Lecture Series. Under the chairmanship of Gilbert E. Doan of Lehigh University, this series will consist of three lectures on the properties, design, welding procedure, inspection and application of aluminum, copper and nickel, respectively. The lectures will be pre-

sented at 4:30 on Monday, Tuesday and Wednesday afternoons.

Monday evening, Oct. 23, is another important date, with a meeting devoted to awards of prizes and medals and the 1950 Adams Lecture. This lecture will be presented by C. H. Jennings of Westinghouse Electric Corp. O. B. J. Fraser, assistant manager of the development and research division, International Nickel Co., and president of the American Welding Society, will preside. H. R. Morrison, chairman of the Convention Committee, will act as co-chairman of the meeting. J. G. Magrath is executive secretary of the American Welding Society, with headquarters at 33 West 39th St., New York 18.

Business Forum Emphasizes Industry's Part in War Effort

The A.S.M. Business Forum—a new activity at the 1950 National Metal Congress and Exposition in Chicago—will afford top-notch executives of the metalworking industries one of their first major opportunities to explain how their companies are geared into the nation's defense program.

E. L. Shaner

When the Business Forum first was planned, before the attack on Korea, it was expected that the speakers would discuss the business outlook for the producers and consumers of ferrous and nonferrous metals. Today the theme remains unchanged, but between now and Oct. 26, when the forum will be staged, the requirements of the Korean situation will have been clarified to such an extent that the forum speakers, in discussing the business outlook, automatically will place heavy emphasis upon industry's participation in the war effort.

The Forum is being planned and arranged by Earl L. Shaner, editor of *Steel* and chairman of the board of Penton Publishing Co. In 1946 Mr. Shaner accompanied a mission around the world as a member of the United States Reparations Commission, studying and reporting on industrial conditions in the Far East and in Europe. As editor-in-chief of *Steel* for some 20 years, he is eminently qualified to combine technical understanding with sound business planning. His broad experience and sound advice will be an invaluable source for the clearance and interpretation of Forum questions and suggestions.

Present plans for the Forum are that an authoritative representative of the iron and steel industry will discuss the capacity available for the present emergency, the percentage of it likely to be diverted to direct war needs and the major consuming channels from which this tonnage will be diverted. Similar information will be presented by an eminent representative of the nonferrous metal-producing industry.

Representatives of five important consumers of ferrous and nonferrous metals will discuss the business outlook as it will be affected by the present emergency. The consuming classifications to be represented are the automotive builders, electrical equipment manufacturers, agricultural equipment manufacturers, the chemical industry and the railroads.

Some of these industries already are in production on war work. In a few instances, corporations in these fields are reopening ordnance plants that were built in World War II and are equipping and organizing them for early production. The railroads recently have released substantial orders for equipment in anticipation of the heavy traffic demands of the near future.

American industry is on the march all along the line in an accelerated effort to be ready for whatever the Government needs to carry out its commitments in Korea and elsewhere. The A.S.M. Business Forum, to be held Thursday morning, Oct. 26, in the grand ballroom of the Palmer House, will afford all visitors to the Metal Congress a splendid opportunity to hear at a single session the views of top executives as to what the metalworking industries are doing, can do and will do to meet the challenge.

A.S.M. Seminar Is on "Atom Movements"

Under the title "Atom Movements", the annual A.S.M. Seminar meetings this year will cover the important subject of diffusion in metals—its theory, techniques, analysis and mechanism.

Twelve papers are scheduled on this program, to be presented in four sessions on Saturday and Sunday morning and afternoon, Oct. 21 and 22. The meetings will precede the formal opening of the National Metal Congress on Monday morning. Saturday's meetings will be held in the Boulevard Room of the Stevens Hotel, Chicago, and the Sunday meetings in the ballroom of the Palmer House. Complete program appears on page 13.

The program was planned and arranged by John H. Hollomon, research associate, General Electric Co., a member of the A.S.M. Seminar Committee. Chairman of this committee is Clarence Zener, associate director, Institute for the Study of Metals, University of Chicago.

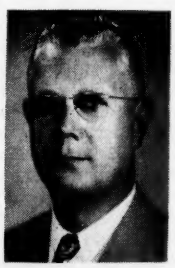
Economy Theaters Have New 1950 Billing

"Economy Theaters" featuring industrial motion pictures that illustrate high production methods and techniques at lower costs will provide a welcome opportunity for combined relaxation and education at the National Metal Show in Chicago. A large and comfortable space in the International Amphitheatre has been set aside where these theaters will be set up to show films that have a definite contribution toward solving production problems.

The Economy Theaters were an innovation last year, when 23 different titles were presented at scheduled showings. New films, new subjects and new stars will be on the bill for 1950. A time schedule for showings of the various films will be posted in the auditorium and printed in the Official Program of the National Metal Congress.

Sales Clinic at Show Will Emphasize Selling Through Industrial Exhibits

A new feature of particular interest to executives and salesmen attending the National Metal Congress and Exposition in Chicago will be an "A.S.M. Sales Clinic". It will be the first meeting of its kind ever scheduled during the annual Metal Show.



C. T. Burg

Principal speaker on the program will be C. T. "Cy" Burg, president and general sales manager of Iron Fireman Corp., who has pushed his sales force from one man 20 years ago to an organization of several thousand salesmen, 1500 dealers and three manufacturing plants in Cleveland, Portland and Toronto. Mr. Burg will have an inspiring message and a wealth of new sales ideas.

Also on the platform with Mr. Burg will be a group of advertising trade paper publishers and editors. Together with the principal speaker, they will act as a panel of experts in answering questions from the audience.

The Clinic will place particular emphasis on the problems of successful industrial displays. Scheduled for Sunday evening, Oct. 22, it will provide a splendid opportunity for the salesmen and executives manning the Metal Show exhibits to get some live-wire ideas before the Exposition opens the following morning. The meeting will be held in the ballroom of the Palmer House and is open to anyone attending the convention.

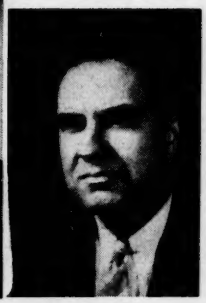
New Officers to Be Installed at Annual Meeting

J. T. MacKenzie
For Trustee

John Chipman
For Vice-President

Walter E. Jominy
For President

William H. Eisenmann
For Secretary



J. B. Austin
For Trustee

New officers of the American Society for Metals will be installed at the annual meeting of the Society on Wednesday morning, Oct. 25, during the National Metal Congress in Chicago. The meeting will be held in the ballroom of the Palmer House at 10:00 a.m. At that time the secretary will cast a unanimous ballot for the election of these officers.

The new officers were selected by the nominating committee last May, and in accordance with the constitution of the A.S.M., no additional nominations having been received by July 15, nominations were declared closed.

Inducted as president will be Walter E. Jominy, staff engineer, Chrysler Corp., Detroit, while John Chipman, head, department of metallurgy, Massachusetts Institute of Technology, will be installed as vice-president. William H. Eisenman has been re-elected for a two-year term as secretary.

Two new trustees will be James B. Austin, director of research, U. S. Steel Corp. Research Laboratories, and James T. MacKenzie, technical director, American Cast Iron Pipe Co.

In addition to these new officers, the board of trustees includes Ralph L. Wilson, chief metallurgical engineer, Timken Steel and Tube Division, treasurer; Elmer Gammeter, chief metallurgist, Globe Steel Tubes Co., trustee; Thomas G. Digges, chief, thermal metallurgy section, National Bureau of Standards, trustee; and Arthur E. Focke, chief metallurgist, Diamond Chain Co., Inc., immediate past president.

During the annual meeting the president, secretary and treasurer will give their reports covering activities of the Society during the past year. The Campbell Memorial Lecture will then be presented.

Seven Canadian Chapters to Assemble

The seven Canadian chapters of the American Society for Metals will again sponsor the annual Canadian Luncheon during the National Metal Congress in Chicago. The luncheon will be held on Tuesday, Oct. 24, in the Palmer House, with members from the British Columbia, Manitoba, Montreal, Northern Ontario, Ontario, Ottawa Valley, and Western Ontario Chapters attending. Tickets must be purchased in advance, either at the registration desk at the Palmer House or at the International Amphitheatre.

Chapter Chairmen Meet for Breakfast

The annual A.S.M. Chapter Chairmen's Breakfast will be held Wednesday morning, Oct. 25, at 8:00 a.m. at the Palmer House, Chicago, as a feature of the National Metal Congress. The board of trustees will attend the breakfast and President Focke will preside. Topics of interest pertaining to the functioning of chapters will be presented for open discussion.

Special Libraries Association Invites Visitors to Literature Indexing Session

A two-day regional meeting of the Metals Group, Science and Technology Division, Special Libraries Association, will take place in Chicago on Thursday and Friday, Oct. 26 and 27, during the week of the National Metal Congress.

Of particular interest to technical men attending the Congress will be a session devoted to the new ASM-SLA Metallurgical Literature Classification. At this meeting, an open discussion will be held in which questions concerning use of the classification and the punched-card system will be answered.

The meeting will be held at 9:30 a.m. on Thursday, Oct. 26, at Illinois Institute of Technology. Anyone attending the National Metal Congress who is interested in the subject of literature classification, indexing and filing is welcome to attend.

The Special Libraries Association will also sponsor a demonstration of the punched-card system during the week of the Chicago Congress. A punched-card file and equipment will be displayed in the booth occupied by the American Society for Metals at International Amphitheatre, and members of the Special Libraries Association will be on hand to answer questions and explain the system.

Twenty Schools Plan Alumni Luncheons Also Battelle, Naval Research Lab

Twenty or more technical schools and colleges will hold alumni luncheons on Wednesday, Oct. 25, during the National Metal Congress and Exposition. The luncheons are scheduled for 12 noon immediately following the Campbell Memorial Lecture.

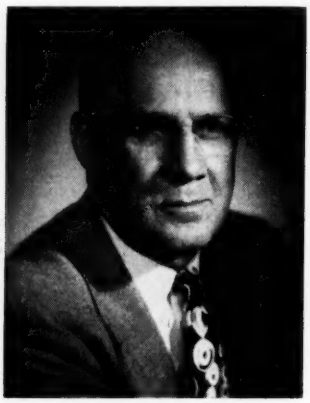
Reservations must be made by 6:00 p.m. of the day preceding the luncheons. They can be made and tickets purchased at the registration desks in the International Amphitheatre or at the Palmer House.

The second annual N.R.L. Alumni Luncheon for all men formerly or presently on the staff of the Naval Research Laboratory, Washington, D. C., will also be held at the Palmer House on Wednesday, Oct. 25.

All men interested in this luncheon should write to Robert C. Wayne, Surface Combustion Corp., Toledo, Ohio, as soon as possible. Definite reservations are requested so that suitable arrangements can be made with the Palmer House.

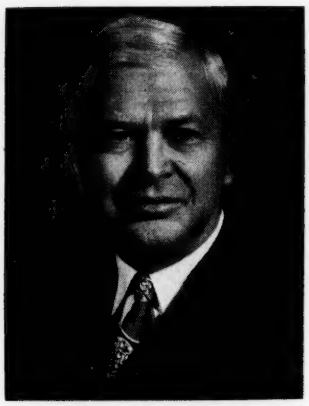
Battelle Memorial Institute will likewise hold its Alumni Luncheon during the Congress. It will be held at the Palmer House on Tuesday, Oct. 24.

Six to Be Honored for Outstanding Achievements



Clarence E. Sims
Sauveur Medalist

Earle C. Smith
Campbell Lecturer



Charles E. Wilson
Research Medalist

Albert Sauveur Achievement Award

The Sauveur Achievement Award, established by the American Society for Metals in 1934, will be presented in 1950 to Clarence E. Sims, assistant director, Battelle Memorial Institute, for his pioneering studies and sound research into the origin and effects of inclusions in cast steels. The purpose of the award is to recognize pioneering metallurgical achievements which have stimulated organized work along similar lines to such an extent that a marked basic advance in metallurgical knowledge has been made. The award will be presented to Dr. Sims during the annual banquet of the Society on Thursday, Oct. 26.

The 1950 winner of the Sauveur Award is the author or co-author of over 50 technical publications, mostly in the field of ferrous metallurgy, and on such subjects as nonmetallic inclusions, deoxidation, gases in metals, and welding problems. He received a B.S. in Chemical Engineering from the University of Illinois in 1915 and an M.S. in Metallurgy from the University of Utah in 1916.

Since then Dr. Sims has worked on electrolytic zinc and copper smelting with Anaconda Copper Mining Co. with the Chemical Warfare Service, in the research laboratory of the Aluminum Co. of America, as electrometallurgist and associate metallurgist at the U.S. Bureau of Mines, and as assistant director of research for American Steel Foundries. In 1936 he became associated with Battelle Memorial Institute as supervising metallurgist in physical metallurgy. At present he is one of the assistant directors of that Institute.

Campbell Memorial Lecture

Earle C. Smith, chief metallurgist for Republic Steel Corp., and this year's A.S.M. Campbell Memorial lecturer, had "his wings singed by the heat of the steel mill" early in life, as he puts it, and has never recovered. This was a good thing for the steel industry!

The Edward deMille Campbell Memorial Lecture, which Mr. Smith will present, is the most important scientific lecture sponsored by the American Society for Metals at its annual meeting on Wednesday morning, Oct. 25.

Earle Smith was an Ohio State University graduate before the days when the school boasted a metallurgy department, and his 1913 degree is that of Engineer of Mines. After doing graduate work in mineralogy at O.S.U., he got his first taste of a steel mill on the open-hearth floor of the Illinois Steel Co. in Gary.

This was interrupted by further graduate work in metallography at Columbia under—significantly enough—Professor Campbell, in whose honor the Campbell Memorial Lecture was established. He then returned to Ohio State as instructor.

In 1919 he came to Central Steel Co. as chief inspector. He became plant metallurgist in 1920, chief metallurgist in 1922, and assistant general superintendent in 1926. When Central Steel and United Alloy Steel merged in 1930 to form Republic Steel Corp., he was appointed assistant district manager, and was given the title of chief metallurgist in 1932.

Mr. Smith has twice before been honored by A.S.M.—in 1945 when he received the Gold Medal, the Society's highest award; and again in 1948, when he received a Distinguished Service Award for meritorious contributions to progress in alloy steel.

Medal for Advancement of Research

One of the country's leading industrialists whose consistent interest in research has promoted metallurgical progress is Charles Erwin Wilson, president of General Motors Corp. For his encouragement of this work and foresight in making the necessary funds available, Mr. Wilson will be honored with the presentation of the A.S.M. Medal for the Advancement of Research at the Society's annual banquet on Oct. 26.

The citation that will accompany the presentation of the medal lists no less than 14 specific developments that have resulted from General Motors research. These range over such widely varied items as the hardenability test for steel, wear resistant cast irons, several types of bearing materials, powder metals, aluminum coatings and zinc alloys.

Starting out as an electrical engineer (Carnegie Tech,

W. O. Binder *C. M. Brown* *R. Franks*

Henry Marion Howe ***Medalists***

1909), Mr. Wilson was himself responsible for a number of designs and innovations in electric motors and related equipment. After ten years at Westinghouse, he joined General Motors in 1919 as chief engineer and sales manager for Remy Electric Co., a G.M. subsidiary. His rise through various other divisions of the company was rapid, each step increasing his executive authority until he was made a vice-president of the Corporation in 1928. He was elected executive vice-president in 1939, acting president in 1940, and president in 1941 following the resignation of Wm. Knudsen.

Henry Marion Howe Medal

For the best paper published in the 1949 *Transactions* of the American Society for Metals, three co-authors will receive the Society's 1950 Henry Marion Howe Medal. They are W. O. Binder and C. M. Brown, metallurgists, Union Carbide and Carbon Research Laboratories, Inc., and Russell Franks, chief metallurgist, sales development and technical service Department, Electro Metallurgical Co.

Title of the paper, published in Vol. 41 of the *Transactions*, is "Resistance to Sensitization of Austenitic Chromium-Nickel Steels of 0.03% Max. Carbon Content". It represents a fundamental investigation of the effect of low carbon content on corrosion resistance of stainless steels. The medals will be presented at the annual banquet of the American Society for Metals on Oct. 26.

Mr. Binder has been on the staff of the Union Carbide laboratories since 1936, doing research work on high-chromium and chromium-nickel steels. He is a graduate of Case Institute of Technology (B.S. in Met. Eng., 1931, and the degree of Metallurgical Engineer in 1936). He was employed by Dow Chemical Co. in the metallurgical department from 1931 to 1936.

Charles M. Brown, the second author, joined the Carbide and Carbon laboratories immediately after graduation in 1941. He has a B.S. in Metallurgical Engineering from University of Michigan.

Russell Franks was employed in the Niagara Falls laboratories of Union Carbide and Carbon from 1921 to 1946, when he was transferred to Electro Metallurgical Co. as chief metallurgist in the sales development and technical service department. He is a graduate of Virginia Polytechnic Institute.

Mr. Franks assisted in the development of the nickel-base alloys known as Hastelloys and in much of the early research work on stainless steels. He is co-author of the book "Alloys of Iron and Chromium" and of many technical papers.

Industrial Gas Breakfast on Wednesday

The annual Industrial Gas Breakfast, sponsored by the Industrial and Commercial Gas Section of the American Gas Association, will be held on Wednesday morning, Oct. 25, at 8:30 a.m. in the Palmer House, Chicago, during the National Metal Congress.

The Gas Association will also sponsor a combined exhibit of industrial gas equipment, occupying a large section of the National Metal Exposition in the International Amphitheatre. In this special section, 11 firms will be represented, and will have individual displays occupying 3600 sq. ft. of floor space.

Gas Appliance Association Meets Tuesday

A meeting and luncheon of the Industrial Gas Equipment Division of the Gas Appliance Manufacturers Association will be held on Tuesday, Oct. 24, during the National Metal Congress in Chicago. The event is scheduled for the Stock Yard Inn, adjacent to the International Amphitheatre, where the National Metal Exposition will be in session.

Three A.S.M. Lecture Courses Will Feature Timely Topics

Three series of educational lectures during the National Metal Congress in October will feature such timely topics as "High-Temperature Properties", "Interpretation of Tests" and "Metallurgy of Titanium".

N. J. Grant

The first series, on "High-Temperature Properties of Metals", will consist of four lectures on Monday, Oct. 23. Two of the lectures will be given in the late afternoon, and two in the evening. Nicholas J. Grant, professor of metallurgy at Massachusetts Institute of Technology, a member of the A.S.M. Educational Committee, served as coordinator and was responsible for arranging this program.

The second series, on "Interpretation of Tests and Correlation With Service", was arranged by Walter E. Jominy, staff engineer, Chrysler Corp., and A.S.M. vice-president. This course will be presented on Tuesday, Oct. 24; it also consists of four lectures in late afternoon and evening.

B. W. Gonser

The third series, on "Metallurgy of Titanium", is scheduled for Wednesday afternoon and evening. The program was arranged by Bruce W. Gonser, supervisor of nonferrous research, Battelle Memorial Institute.

The lectures are open to anyone attending the Metal Congress, and will all be held in the ballroom of the Palmer House, Chicago. The complete program of titles and speakers is shown on page 13. John F. Kahles, associate professor of metallurgical engineering, University of Cincinnati, is chairman of the Educational Committee of the American Society for Metals.

Chicago Offers Varied Program of Entertainment for Ladies at Congress

The ladies who attend the National Metal Congress in Chicago will be offered a varied program of entertainment. The facilities offered by this interesting metropolis will provide one or more events on each of the first four days of the Congress. The program is as follows:

Monday, Oct. 23

10:00 A.M.—"Welcome Travelers" broadcast, College Inn, Hotel Sherman; prizes for the ladies.
1:00 P.M.—Luncheon, Empire Room, Palmer House.

Tuesday, Oct. 24

2:00 P.M.—Tour of North and South Shores; about 3½ hours.

Wednesday, Oct. 25

12:30 P.M.—Luncheon, Art Institute.
2:00 P.M.—Tour of Art Institute.

Thursday, Oct. 26

12:30 P.M.—Luncheon at Chicago's famous Pump Room, Ambassador Hotel, East

Card tables will be set up in the ladies' headquarters for use at any time desired

Headquarters and registration will be maintained in the Palmer House, headquarters of the American Society for Metals, and in the Sherman Hotel, headquarters of the American Welding Society A small registration fee will be charged to cover a portion of the expense involved.

Technical Program of

AMERICAN SOCIETY FOR METALS

Palmer House, Chicago, Oct. 21-27, 1950

Monday, Oct. 23

9:30 A. M.—Ballroom, Palmer House

Surface Phenomena Session

9:30 A. M.—**The Carbonitriding Process of Case Hardening Steel,** by G. W. P. Rengstorff, Battelle Memorial Institute, M. B. Bever and C. F. Floe, Massachusetts Institute of Technology.

10:00 A. M.—**Constitution of Carbonitrided Cases,** by G. W. P. Rengstorff, Battelle Memorial Institute, M. B. Bever and C. F. Floe, Massachusetts Institute of Technology.

10:30 A. M.—**Effect of Bath Composition on Aluminum Coatings on Steel,** by D. O. Gittings, D. H. Rowland and J. O. Mack, Carnegie-Illinois Steel Corp.

11:00 A. M.—**Formation of Oxides on Some Stainless Steels at High Temperatures,** by H. M. McCullough, Sylvania Electric Products Inc., and M. G. Fontana and F. H. Beck, Ohio State University.

11:30 A. M.—**The Oxidation of Pure Iron,** by J. K. Stanley and Miss J. vonHoene, Westinghouse Research Laboratories, and R. T. Huntoon, Carnegie Institute of Technology.

2:00 P. M.—Ballroom, Palmer House

Physical Metallurgy Session

2:00 P. M.—**Recovery and Cold Working of 52S Commercial Aluminum Alloy,** by Gerard H. Boss, Metallurgy Division, Oak Ridge National Laboratory.

2:30 P. M.—**A Metallurgical Investigation of Silver Chloride,** by R. D. Moeller, F. W. Schonfeld, C. R. Tipton, Jr., and J. T. Waber, Los Alamos Scientific Laboratory.

3:00 P. M.—**Molybdenum Plating by Reduction of the Pentachloride Vapor,** by W. J. Childs, J. E. Cline, W. M. Kisner and John Wulff, Massachusetts Institute of Technology.

3:30 P. M.—**Structure of Permanent Magnet Alloys,** by A. H. Geisler, General Electric Co.

Tuesday, Oct. 24

9:30 A. M.—Ballroom, Palmer House

High-Temperature Metallurgy Session

9:30 A. M.—**Transformations in Ferritic Chromium Steels Between 1100 and 1500° F. (595 and 815°C),** by F. J. Shortsleeve and M. E. Nicholson, Standard Oil Co.

10:00 A. M.—**Hardening of High-Chromium Steels by Sigma Phase Formation,** by John J. Gilman, Crucible Steel Co. of America.

10:30 A. M.—**Nickel-Aluminum-Molybdenum Alloys for Service at Elevated Temperatures,** by H. V. Kinsey, Department of Mines and Technical Surveys, Ottawa, and M. T. Stewart, National Research Council of Canada.

11:00 A. M.—**Sigma Phase Formation in a Wrought Heat Resisting Steel,** by A. E. Bindari, Illinois Institute of Technology; P. K. Koh, Allegheny Ludlum Steel Corp., and Otto Zmeskal, Illinois Institute of Technology.

11:30 A. M.—**Long-Time Elevated-Temperature Test of Chromium-Molybdenum Steels,** by A. B. Wilder and J. O. Light, National Tube Co. (This paper not preprinted)

2:00 P. M.—Ballroom, Palmer House

High-Temperature Metallurgy Session

2:00 P. M.—**Formation of Austenite in High-Chromium Stainless Steels,** by C. B. Post and W. S. Eberly, Carpenter Steel Co.

2:30 P. M.—**Influence of Austenitizing Time and Temperature on Austenite Grain Size of Steel,** by O. O. Miller, Research Laboratory, U. S. Steel Corp.

3:00 P. M.—**Carbide Precipitation in AISI Type 304 Stainless Steel—an Electron Microscope Study,** by E. M. Mahla and N. A. Nielsen, E. I. du Pont de Nemours & Co.

3:30 P. M.—**Some Aspects of Graphitization in Steel,** by G. V. Smith, J. A. MacMillan and E. J. Dulis, Research Laboratory, U. S. Steel Corp.

Wednesday, Oct. 25

9:30 A. M.—Ballroom, Palmer House

A.S.M. Annual Meeting

10:00 A. M.—Edward deMille Campbell Memorial Lecture, by Earle C. Smith, Chief Metallurgist, Republic Steel Corp.

2:00 P. M.—Ballroom, Palmer House

Heat Treatment Session

2:00 P. M.—**A Hardenability Test for Deep Hardening Steels,** by William Wilson, Jr., Armour Research Foundation.

2:30 P. M.—**An Examination of the Quenching Constant, H,** by D. J. Carney and A. J. Janulionis, Carnegie-Illinois Steel Corp.

3:00 P. M.—**The Tempering of Chromium Steels,** by R. W. Balluffi, Sylvania Electric Products, Inc.; Morris Cohen and B. L. Averbach, Massachusetts Institute of Technology.

3:30 P. M.—**Austenite Transformation,** by Axel Hultgren, Professor of Metallography, K. Tekniska Hogskolan, Stockholm, Sweden. (This paper not preprinted)

Thursday, Oct. 26

9:30 A. M.—Ballroom, Palmer House

Fracture Session

9:30 A. M.—**Grain and Grain Boundary Compositions: Mechanism of Temper Brittleness,** by J. W. Spretnak and Rudolph Speiser, Ohio State University.

10:00 A. M.—**Effect of Strain Rate on Toughness of Temper Brittle Steel,** by D. C. Buffum and L. D. Jaffe, Watertown Arsenal.

10:30 A. M.—**The Influence of Chromium on the Mechanical Properties of Plain Chromium Steels,** by W. O. Binder and Howard R. Spendelow, Jr., Union Carbide and Carbon Research Laboratories, Inc.

11:00 A. M.—**Rheotropic Embrittlement of Steel,** by E. J. Ripling and W. M. Baldwin, Jr., Case Institute of Technology.

11:30 A. M.—**Embrittlement of Stainless Steel by Steam in Heat Treating Atmospheres,** by C. A. Zapffe and R. L. Phebus, Research Metallurgists.

Thursday, Oct. 26

9:30 A. M.—Room 14, Palmer House

Constitution of Alloys Session

9:30 A. M.—**The Ternary System Chromium-Molybdenum-Iron,** by J. W. Putman, Massachusetts Institute of Technology; R. D. Potter, University of California; and N. J. Grant, Massachusetts Institute of Technology.

10:00 A. M.—**The Ternary System Indium-Cadmium-Zinc,** by S. C. Carapella, Jr., and E. A. Peretti, University of Notre Dame.

10:30 A. M.—**The Determination of Solidus Temperatures in Magnesium Alloys by Dilatometric Measurements,** by Heinrich Adenstedt, Wright-Patterson Air Force Base, and Jay R. Burns, Dow Chemical Co.

11:00 A. M.—**Constitution and Mechanical Properties of Zirconium-Iron Alloys,** by E. T. Hayes, A. H. Roberson and W. L. O'Brien, Bureau of Mines, Albany, Ore.

2:00 P. M.—Ballroom, Palmer House

Fracture Session

2:00 P. M.—**Fracturing of Silicon Ferrite Crystals,** by C. F. Tipper, Cambridge University, England, and M. Sullivan, Naval Research Laboratory, Washington, D. C.

2:30 P. M.—**A Study of Cleavage Surfaces in Ferrite,** by E. P. Klier, University of Maryland.

3:00 P. M.—**Fractographic Registrations of Fatigue,** by C. A. Zapffe and C. O. Worden, Research Metallurgists.

3:30 P. M.—**Effect of Alloying Elements on Notch Toughness of Pearlitic Steels,** by J. A. Rinebolt and W. J. Harris, Jr., Naval Research Laboratory.

Three Lecture Courses

All Sessions in Ballroom, Palmer House

High-Temperature Properties of Metals

Monday, Oct. 23

4:15 P. M.—**Stress-Rupture Testing,** by N. J. Grant, Massachusetts Institute of Technology.

5:15 P. M.—**Fatigue,** by Howard C. Cross, Battelle Memorial Institute.

8:00 P. M.—**Creep,** by Earl R. Parker, University of California. **Service Experience,** by John J. B. Rutherford, Babcock and Wilcox Tube Co.

9:00 P. M.—**Oxidation,** by Carl Wagner, Massachusetts Institute of Technology.

Interpretation of Tests and Correlation With Service

Tuesday, Oct. 24

4:15 P. M.—**Correlation of Laboratory Tests and Service Performance,** by M. F. Garwood, H. H. Zurburg, and M. A. Erickson, Chrysler Corp.

5:15 P. M.—**Wear Tests and Service Performance,** by J. T. Burwell, Massachusetts Institute of Technology.

8:00 P. M.—**Corrosion Tests vs. Service Performance,** by Frank LaQue, International Nickel Co.

9:00 P. M.—**Limitations of Mechanical Testing,** by M. Gensamer, Carnegie-Illinois Steel Corp.

Metallurgy of Titanium

Wednesday, Oct. 25

4:15 P. M.—**Historical Development, Extractive Metallurgy, General Properties of the Metal of Commercial Grades,** by W. J. Kroll, Bureau of Mines.

5:15 P. M.—**Melting, Casting, Working, Fabrication, and Testing,** by W. L. Finlay, Remington Arms Co.

8:00 P. M.—**Alloys of Titanium,** by Robert Jaffee, Battelle Memorial Institute.

Friday, Oct. 27

9:30 A. M.—Ballroom, Palmer House

Plasticity Session

9:30 A. M.—**The Stress-Strain Energy Relationship for Metals,** by D. J. McAdam, Jr., Consulting Metallurgist.

10:00 A. M.—**Tension-Compression Biaxial Plastic Stress-Strain Relations for Aluminum Alloys 24S-T and 2S-0,** by J. H. Faupel, E. I. du Pont de Nemours & Co., and Joseph Marin, Pennsylvania State College.

10:30 A. M.—**Hot Forming of Aluminum and Magnesium Alloys,** by T. E. Piper, Northrop Aircraft, Inc.

11:00 A. M.—**Strain Hardening of Mild Steel in the Torsion Test as a Function of Temperature,** by Hugh Larson, Massachusetts Institute of Technology, and E. P. Klier, University of Maryland.

9:30 A. M.—Red Lacquer Room, Palmer House

Physical Metallurgy Session

9:30 A. M.—**The Powder Metallurgy of Beryllium,** by H. H. Hausner and Norman P. Pinto, Sylvania Electric Products, Inc.

10:00 A. M.—**The Dimensional Behavior of Invar,** by B. S. Lement, University of Notre Dame; B. L. Averbach and Morris Cohen, Massachusetts Institute of Technology.

10:30 A. M.—**Preparation and Properties of Titanium-Chromium Binary Alloys,** by D. J. McPherson, Armour Research Foundation, and M. G. Fontana, Ohio State University.

11:00 A. M.—**Statistical Analysis of the Effect of Alloying Elements on Mechanical Properties of Seamless Steel Tubes,** by W. T. Rogers, National Tube Co.

11:30 A. M.—**Grindability of Tool Steels,** by L. P. Tarasov, Norton Co.

Seminar on Atom Movements

Saturday, Oct. 21

9:30 A. M.—Boulevard Room, Stevens Hotel

Formal Basis of Diffusion Theory, by L. Darken, U. S. Steel Corp. Research Laboratories.

Chemical Techniques and Analysis of Diffusion Data, by Cyril Wells, Carnegie Institute of Technology.

Tracer and Other Techniques, by R. Hoffman, General Electric Co., Research Laboratory.

2:00 P. M.—Boulevard Room, Stevens Hotel

Mechanisms of Diffusion, by H. Huntington, Rensselaer Polytechnic Institute.

Diffusion in Two-Component Systems, by J. Bardeen, Bell Telephone Laboratories.

Analysis of Bulk Diffusion Data, by C. E. Birchenall, Carnegie Institute of Technology.

Sunday, Oct. 22

9:30 A. M.—Ballroom, Palmer House

Surface and Boundary Diffusion, by D. Turnbull, General Electric Co., Research Laboratories.

Diffusion and High-Temperature Oxidation, by C. Wagner, Massachusetts Institute of Technology.

Gas-Metal Diffusion and Internal Oxidation, by F. N. Rhines, Carnegie Institute of Technology.

2:00 P. M.—Ballroom, Palmer House

Diffusion in Sintering, by P. Duwez, California Institute of Technology.

Boundary Movements, by J. Burke, General Electric Co., Knolls Atomic Power Laboratory.

Summary, by R. F. Mehl, Carnegie Institute of Technology.

GENERAL DISCUSSION

31st Annual Meeting

AMERICAN WELDING SOCIETY

Hotel Sherman, Chicago, Oct. 22-27, 1950

Sunday, Oct. 22

3:00 P. M.—Ballroom, Hotel Sherman

President's Reception

Monday, Oct. 23

9:30 A. M.—Ballroom, Hotel Sherman

Weldability

Chairman: R. E. Somers, Bethlehem Steel Co.

Co-Chairman: L. C. Bibber, Carnegie-Illinois Steel Corp.

The Influence of Low-Temperature Cooling Rates Following Welding on the Ductility of Arc Welds in Mild Steel, by A. E. Flanigan, S. I. Bocarsky, and G. B. McGuire, University of California.

The Effect of Nitrogen on Brittle Behavior of Mild Steel, by G. H. Enzian and G. J. Salvaggio, Jones & Laughlin Steel Corp.

The Micro-Mechanism of Fracture of Structural Steels, in the Tension-Impact Test, by W. H. Bruckner, University of Illinois.

Influence of Biaxiality on Notch Brittleness, by D. Rosenthal, University of California, and W. D. Mitchell, Douglas Aircraft Co.

9:30 A. M.—Louis XVI Room, Hotel Sherman

Resistance Welding

Chairman: Jack Ogden, Fisher Body Div., G. M. C.

Co-Chairman: R. E. Powell, Western Electric Co.

Development of Production Welding Techniques, by J. Raymond Wirt, Delco-Remy Div., General Motors Corp.

Spot Welding of Thin Materials With Short Time-Constant Equipment, by Franklin Page, Jr., Du Fresne and Page Engineering Co., and Frank Johnson, Unitek Corp.

Problems in the Design and Operation of Tube Mills for High-Speed Production, by Donald H. Fleig, American Electric Fusion Corp.

The Spreading Resistance of Contacts, by W. B. Kouwenhoven, Johns Hopkins University, and W. T. Sackett, Jr., Battelle Memorial Institute.

9:30 A. M.—Crystal Room, Hotel Sherman

Surfacing

Chairman: T. B. Jefferson, Welding Engineer

Co-Chairman: R. L. Townsend, Tweco Products Co.

Some Characteristics of Composite Tungsten Carbide Weld Deposits, by H. S. Avery, American Brake Shoe Co.

Hard Facing of Steam Valve Seats and Disks, by O. E. Swenson, U. S. Naval Engineering Experiment Station.

New Production Applications of Hard Facing, by Eldon C. Hurt, Haynes Stellite Div., Union Carbide and Carbon Corp.

The Present Status of Composite Metal Fabrication for Arc Welding, by H. E. Cable, Lincoln Electric Co.

2:00 P. M.—Crystal Room, Hotel Sherman

Flame Hardening

Chairman: A. F. Chouinard, National Cylinder Gas Co.

Co-Chairman: E. C. Brekelbaum, Harnischfeger Corp.

Commercial Flame Hardening, by E. J. Cox, Pittsburgh Commercial Heat Treating Co.

Flame Hardening of Large Surfaces, by J. J. Barry, Air Reduction Sales Co.

Production Flame Hardening, by Milton Garvin, Cincinnati Milling Machine Co.

2:00 P. M.—Louis XVI Room, Hotel Sherman

Arcs, Electrodes and Fluxes

Chairman: C. I. MacGuffie, General Electric Co.

Co-Chairman: H. E. Rockefeller, Linde Air Products Co.

Research Techniques for Study of Arcs in Inert Atmospheres, by Roger H. Gillette, Linde Air Products Co., and R. T. Breymeier, Union Carbide and Carbon Research Labs., Inc.

Aluminum-Magnesium Filler Metals for Welding High-Strength Aluminum Alloys, by R. D. Williams, and D. C. Martin, Battelle Memorial Institute.

Characteristics of Inert-Gas Shielded Metal Arcs, by Albert Muller, G. R. Rothschild and W. J. Greene, Air Reduction Co., Inc.

2:00 P. M.—Ballroom, Hotel Sherman

Research

Chairman: Perry R. Cassidy, Babcock & Wilcox Co.

Co-Chairman: F. L. Plummer, Hammond Iron Works

Room-Temperature Tensile Tests as an Index of Transition Temperature of Steel Plate, by S. S. Tor, R. D. Stout, and Bruce G. Johnston, Lehigh University.

Interpretive Report, Fabrication Division, PVRC, by H. C. Boardman, Chicago Bridge & Iron Co.

Plastic Deformation in Weldments Under Combined Stresses, by William S. Pellini, Naval Research Laboratory.

2:00 P. M.—Bal Tabarin Room, Hotel Sherman

Panel Discussion on Recommended Practices for Resistance Welding

Sponsored by A.W.S. Resistance Welding Committee

Chairman: J. Heuschkel, Westinghouse Electric Corp.

Co-Chairman: J. J. MacKinney, Budd Co.

Historical Background, by Wilson Scott, Westinghouse Electric Corp.

Keynote of Quality, by R. T. Gillette, General Electric Co.

Aluminum and Magnesium Alloys, by W. J. Wilson, Lavelle Aircraft Corp.

Copper Alloys and Dissimilar Nonferrous Metals, by J. B. Welch, Cutler-Hammer, Inc.

Carbon and Low-Alloy Steels, by J. Heuschkel, Westinghouse Electric Corp.

Nickel and Nickel Alloys, by R. M. Wilson, Jr., International Nickel Co.

Stainless Steels, by J. J. MacKinney, Budd Co.

Coated Materials, by E. A. Bussard, Coleman Co., Inc.

High-Speed Motion Pictures.

4:30 P. M.—Louis XVI Room, Hotel Sherman

Educational Lecture Series

Chairman: Gilbert E. Doan, Lehigh University

Presiding: Fred L. Plummer, Hammond Iron Works

Aluminum: Properties, Design, Procedure, Inspection and Application, by G. O. Hoglund, Aluminum Co. of America.

8:00 P. M.—Ballroom, Hotel Sherman

Award of Prizes and Medals

1950 Adams Lecture

Chairman: O. B. J. Fraser
President, American Welding Society

Co-Chairman: H. R. Morrison
Chairman, Convention Committee

Dynamic Characteristics of D. C. Welding Machines, by C. H. Jennings, Westinghouse Electric Corp.

Tuesday, Oct. 24

9:30 A. M.—Crystal Room, Hotel Sherman

Pipe Fabrication

Chairman: D. H. Corey, Detroit Edison Co.
Co-Chairman: E. R. Seabloom, Crane Co.

Development of Welding Procedure for High-Pressure, High-Temperature Steam Piping, by N. L. Navarre, U. S. Naval Engineering Experiment Station.

Fabrication and Welding of High-Pressure High-Temperature Alloy Piping, by H. J. Irrgang, Jr., W. K. Mitchell & Co.

Design and Installation of Large-Diameter, Long-Span Welded Pipe, by Horace Jackson, Thompson Pipe and Steel Co.

Welding of Heavy Wall Type 347 Stainless Steel Piping, by R. W. Emerson, Pittsburgh Piping & Equipment Co.

9:30 A. M.—Louis XVI Room, Hotel Sherman

Resistance Welding

Chairman: T. Embury Jones
Precision Welding & Machine Co.
Co-Chairman: R. C. McMaster
Battelle Memorial Institute

A Practical Method for Obtaining Consistent Resistance Welds, by J. W. Kehoe, Westinghouse Electric Corp.

Variables in Cross-Wire Welding Dissimilar Metals, by I. S. Goodman, Westinghouse Electric Corp.

Resistance Spot and Seam Welding of Aircraft Materials Using D. C. Current, by J. H. Cooper, Taylor-Winfield Corp.

The Projection Welding of 0.010 and 0.020-In. Steel Sheet, by E. F. Nippes, J. M. Gerken, and J. G. Maciora, Rensselaer Polytechnic Institute.

9:30 A. M.—Ballroom, Hotel Sherman

Ship Structure

Chairman: Capt. C. M. Tooke, Bureau of Ships
Co-Chairman: Cmdr. R. D. Schmidtman, U. S. Coast Guard

Work of the Ship Structure Committee, by Rear Admiral K. K. Cowart, U. S. Coast Guard.

Welded Reinforcement of Openings in Structural Steel Members, by D. Vasarhelyi and R. A. Hechtman, University of Washington.

The Determination of Initial Stresses and Results of Tests on Steel Plates, by E. W. Suppiger, Carlo Riparbelli, and E. R. Ward, Princeton University.

Some Metallurgical Aspects of Ship Steel Quality, by H. M. Banta, R. H. Frazier, and C. H. Lorig, Battelle Memorial Institute.

2:00 P. M.—Crystal Room, Hotel Sherman

Resistance Welding

Chairman: B. L. Wise
National Electric Welding Machines Co.
Co-Chairman: J. R. Randall, Ford Motor Co.

Optimum Flash Welding Conditions for Aluminum Alloys, the Importance of Upset Variables, by E. F. Nippes, W. F. Savage, P. Patriarca, and J. J. McCarthy, Rensselaer Polytechnic Institute.

Flash Welding Nonferrous Materials, by F. L. Brandt, Jr., Thomson Electric Welder Co.

Spot Welding of Scaly Heavy-Gage Structural Steel, by E. F. Nippes, Ramsey, and J. G. Maciora, Rensselaer Polytechnic Institute.

12:30 P. M.—Bal Tabarin Room

Special Luncheon—Design

Introduction, by H. R. Morrison,

Design for Production Economies, by G. F. Nordenholt, Product Engineering.

2:00 P. M.—Louis XVI Room, Hotel Sherman

Technical Session on Design

Chairman: G. F. Nordenholt, Product Engineering
Co-Chairman: H. W. Pierce, New York Shipbuilding Corp.

Organization for Design for Production Economy, by T. J. Crawford, Consulting Engineer.

Economies Accomplished by Redesign for Welding, by Kenneth Jackson, Caterpillar Tractor Co.

Applications of Welded Design for Cost Reduction, by R. H. Bennewitz, Linde Air Products Co.

2:00 P. M.—Ballroom, Hotel Sherman

Ship Structure

Chairman: D. P. Brown, American Bureau of Shipping
Co-Chairman: Finn Jonassen, National Research Council

Notch Sensitivity of Welded Ship Plate by Explosion Test, by G. S. Mikhalapov, Metallurgical Research and Development Co., Inc.

Stress Studies of Welded Ship Structure Specimens, by Wm. R. Campbell, Engineering Mechanics Section, National Bureau of Standards.

The Distribution of the Locked-In Stresses in a Large Welded Steel Box Girder, by John Vasta, Bureau of Ships, Navy Department.

4:30 P. M.—Louis XVI Room, Hotel Sherman

Educational Lecture Series

Chairman: Gilbert E. Doan, Lehigh University
Presiding: D. H. Corey, Detroit Edison Co.

Copper: Properties, Design, Procedure, Inspection and Application, by J. R. Hunter, Revere Copper and Brass Co., Inc.

8:00 P. M.—Bal Tabarin Room, Hotel Sherman

Applied Welding Engineering

A Symposium on Proper Application of Welding Processes

Sponsored by A.W.S. Technical Activities Committee

Chairman: C. D. Evans
Chairman, Technical Activities Committee
Co-Chairman: S. A. Greenberg
Technical Secretary A. W. S.

Introduction, by C. D. Evans, International Harvester Co., (Chairman, Technical Activities Committee)

Design, by J. J. Chyle, A. O. Smith Corp. (Chairman, Automotive Welding Committee).

Materials, by A. N. Kugler, Air Reduction Sales Co. (Chairman, A. W. S. Committee on Brazing and Soldering)

Workmanship, by R. W. Clark, General Electric Co. (Chairman, A. W. S. Committee on Standard Qualification Procedures, and A. W. S. Army Ordnance Advisory Committee).

Inspection, by J. Lyell Wilson, Consulting Engineer (Vice-Chairman, Technical Activities Committee, and Chairman, A. W. S. Committee on Welding in Marine Construction).

Applications, by S. A. Greenberg, Technical Secretary, A. W. S.

Discussion

Wednesday, Oct. 25

9:30 A. M.—Ballroom, Hotel Sherman

Education

Symposium on the Need of Professional Training for the Welding Engineer

Chairman: R. S. Green, Ohio State University
Co-Chairman: M. L. Begeman, University of Texas

EMPLOYER POINT OF VIEW

Viewpoint of Representative of Bureau of Ships, Navy Dept., by A. G. Bissell, Bureau of Ships, Navy Department.

Viewpoint of Representative of Industrial Research, by J. Heuschkel, Westinghouse Electric Corp.

Viewpoint of Representative of Fabrication Industry, by J. J. Chyle, A. O. Smith Corp.

What Is Needed in the Professional Training of a Welding Engineer, by J. M. Parks, Welding Research, Armour Research Foundation.

Viewpoint of Representative of an Eastern Private University, by G. E. Doan, Lehigh University.

Viewpoint of Representative of a Private Engineering School, by R. A. Wyant, Rensselaer Polytechnic Institute.

COLLEGE POINT OF VIEW

Viewpoint of Representative of a Western State University, by G. S. Schaller, University of Washington.

Presentation of papers to be followed by an Authors' Round Table Discussion and General Discussion.

Wednesday, Oct. 25

9:30 A. M.—Louis XVI Room, Hotel Sherman

Research

Chairman: G. E. Claussen, Reid-Avery Co.
Co-Chairman: O. T. Barnett, Metal & Thermit Corp.

The Rotary Electrode for Manual Metallic-Arc Welding, by Gilbert S. Schaller, University of Washington.

Effects of Reduced Atmospheric Pressures on Arc Welding Characteristics, by M. L. Begeman, B. H. Amstead and U. I. Mashruwala, University of Texas.

Transformation of Austenite in a Manganese-Molybdenum Steel Deposited as Weld Metal, by O. O. Miller, F. C. Kristufek and R. H. Aborn, United States Steel Corp.

Stress Relieving and Fracture Strength, by D. Swan, A. R. Lytle and C. McKinsey, Union Carbide & Carbon Research Laboratories.

9:30 A. M.—Crystal Room, Hotel Sherman

Structural

Chairman: L. S. McPhee, Whiting Corp.
Co-Chairman: I. E. Boberg, Chicago Bridge & Iron Co.

Connections for Welded Rigid Portal Frames, by Anthony Topractsoglou, Lynn S. Beedle, and Bruce G. Johnston, Lehigh University.

Stress Redistribution Above the Elastic Limit for a Welded Frame, by L. E. Grinter and John Butkus, Illinois Institute of Technology, and Charles G. Peller, Valparaiso University.

Buckling of Intermittently Supported Rectangular Plates, by Charles H. Norris, D. A. Polychrone and L. J. Capozzoli, Massachusetts Institute of Technology.

Welded Eccentric Girders for Composite Bridge Construction, by R. E. Robertson, Saxe, Williar and Robertson.

2:00 P. M.—Louis XVI Room, Hotel Sherman

Machinery and Maintenance

Chairman: R. E. McFarland, Western Electric Co.
Co-Chairman: J. C. Menzies, J. C. Menzies & Co.

Welding as Applied to Manufacture of Farm Tractors, by J. L. Buchholz, International Harvester Co., Farmall Works.

Tubular Sections in Frame Design of Hydraulic Benders, by E. J. DeWitt, Wallace Supplies Mfg. Co.

Electric Utility Welding in the Shop and Field, by David P. O'Connor, Dept. of Water and Power, City of Los Angeles.

2:00 P. M.—Ballroom, Hotel Sherman

Controls, Standards

Chairman: J. Lyell Wilson, Consulting Naval Architect
Co-Chairman: Roger Clark, General Electric Co.

Procedure Approval Tests, by S. S. Katsef, U. S. Naval Engineering Experiment Station.

Better Welding at Lower Costs, by Lew Gilbert, Industry and Welding.

Suggested New Welding Standards, by J. F. Lincoln, Lincoln Electric Co.

2:00 P. M.—Crystal Room, Hotel Sherman

Machine Welding

Chairman: F. E. McAtee, Chicago Bridge & Iron Co.
Co-Chairman: Amel R. Meyer, Graver Tank & Mfg. Co.

Welding With Multiple Electrodes in Series, by E. L. Frost, Union Carbide and Carbon Research Labs., Inc.

Automatic Welding in Steel Mill Maintenance, by W. P. Hoffman, International Harvester Co., Wisconsin Steel works.

4:30 P. M.—Louis XVI Room, Hotel Sherman

Educational Lecture Series

Chairman: Gilbert E. Doan, Lehigh University
Presiding: J. J. Chyle, A. O. Smith Corp.

Nickel: Properties, Design, Procedure, Inspection and Application, by R. M. Wilson, Jr., International Nickel Co. Inc.

6:30 P. M.—Louis XVI Room, Hotel Sherman

Section and National Officers Dinner

6:30 P. M.—Jade Room, Hotel Sherman

University Research Dinner

7:30 P. M.—Louis XVI Room, Hotel Sherman

Business Meeting
and Section Officers Conference

7:30 P. M.—Crystal Room, Hotel Sherman

University Research Conference

Thursday, Oct. 26

9:30 A. M.—Louis XVI Room, Hotel Sherman

Nonferrous Metals

Chairman: C. H. Jennings, Westinghouse Electric Corp.
Co-Chairman: A. M. Setapen, Handy & Harman

Welding Aluminum With Inert Arc D. C., by John W. Mortimer, Whitlock Mfg. Co.

The Effect of Welding on the Properties of Titanium-Carbon Alloys, by E. M. Mahla and R. B. Hitchcock, E. I. du Pont de Nemours & Co.

Aircomatic Welding of Copper-Base Alloys, by Harold Robinson and J. H. Berryman, Air Reduction Co., Inc.

Copper Alloy Brazing for Production Economy, by Clinton E. Swift and E. B. Brown, American Brass Co.

9:30 A. M.—Ballroom, Hotel Sherman

Pressure Vessels

Chairman: W. B. Bunn, M. W. Kellogg Co.
Co-Chairman: K. L. Walker, Foster Wheeler Corp.

Stress Concentration Problems in Welded Construction at Atmospheric and Elevated Temperatures, by G. J. Green and D. H. Marlin, Dravo Corp.

Multiple Layer Submerged-Arc Welding of Pressure Vessels, by L. C. Stiles and D. H. Curry, Chicago Bridge & Iron Co.

General Procedure for Fabrication of Pressure Vessels, by S. V. Williams, A. O. Smith Corp.

Welding of Stainless Steel Containers to Meet Sanitary Standards, by P. H. Mounts, Cherry-Burrell Corp.

9:30 A. M.—Crystal Room, Hotel Sherman

Aircraft

Chairman: J. B. Johnson, Office of Air Research, USAF
Co-Chairman: S. L. Hoyt, Battelle Memorial Institute

Heliarc Welding in Production, by T. E. Piper, Northrop Aircraft, Inc.

The Evaluation of Factors Influencing the Crack Sensitivity of Several Aircraft Steels, by A. W. Steinberger, B. J. DeSimone and J. Stoop, Curtis-Wright Corp.

Some Basic Problems in Design for Aircraft Welding, by J. Koziarski and K. B. Gillmore, Piasecki Helicopter Corp.

Jigs and Fixtures for Inert-Gas Arc Welding, by H. A. Huff, Jr., and A. N. Kugler, Air Reduction Sales Co.

12:30 P. M.—Jade Room, Hotel Sherman

Luncheon and Meeting
Board of Directors

1:00 P. M.—Electro Motive Div., G. M. C.

Inspection Trip

Friday, Oct. 27

9:30 A. M.—Ballroom, Hotel Sherman

Inert-Gas Metal-Arc Welding

Chairman: G. O. Hoglund, Aluminum Co. of America
Co-Chairman: S. M. Spice, Buick Div., G. M. C.

Aircomatic Welding of Nickel and Stainless Clad Steels, by T. T. Watson and R. R. Rothermel, Lukens Steel Co.

Aircomatic Welding of Austenitic Nickel-Chromium Stainless Steel, by W. G. Benz, Jr., and J. S. Sohn, Air Reduction Co., Inc.

Argon Metal-Arc Welding Nonferrous Metals and High and Low-Alloy Steels, by H. T. Herbst, Linde Air Products Co.

Construction of Welded Aluminum Ammonium Nitrate Prilling Tower, by H. N. Hockensmith, Brown & Root, Inc.

9:30 A. M.—Crystal Room, Hotel Sherman

Oxygen Cutting

Chairman: E. V. David, Air Reduction Sales Co.

Co-Chairman: R. S. Babcock, Linde Air Products Co.

The Use of Electronically Guided Template Tracing Devices in Shape Flame Cutting, by R. O. Fish, Fairbanks, Morse & Co.

Foundry Applications for Oxygen, Acetylene and Other Gases, by G. E. Bellew, Air Reduction Sales Co.

Production Edge-Preparation and Shaping of Plate for Welding, by C. A. Heffernon, Linde Air Products Co.

Designing Around a Process, by R. F. Helmkamp, Air Reduction Sales Co.

9:30 A. M.—Louis XVI Room, Hotel Sherman

Locomotives and Railroads

Chairman: H. E. Gannett, Consulting Railroad Engineer

Co-Chairman: John H. Hruska, Consulting Engineer

Fabrication of Main Line and Switcher Locomotives, by Fred T. Perry, General Electric Co.

Reclamation of Diesel Locomotive Parts, by LaMotte Grover and R. L. Rex, Air Reduction Co., Inc.

Economy of Reclamation by Welding at the Railroad Reclamation Plant, by W. G. Muschler, Chicago, Burlington & Quincy Railroad.

Rehabilitation of Ore Cars, by J. F. Likarish, Great Northern Railway Co.

Annual Fall Meeting

INSTITUTE OF METALS DIVISION A.I.M.E.

All meetings at Hotel Sheraton, Chicago, Oct. 23-25, 1950

Monday, Oct. 23

Morning Session

Plastic Deformation

Chairman: B. Averbach

Secretary: P. Kosting

An Experimental Survey of Deformational and Annealing Processes in Zinc, by D. C. Jillson.

Quantitative Stress-Strain Studies on Zinc Single Crystals in Tension, by D. C. Jillson

A Study of the Plastic Behavior of High-Purity Aluminum Single Crystals at Various Temperatures, by F. D. Rosi and C. H. Mathewson.

A Study of Strain Markings in Aluminum, by B. R. Banerjee.

RESEARCH IN PROGRESS

Rolling Texture in Aluminum, by H. Hu and Paul A. Beck.

Afternoon Session

Recrystallization and Annealing Textures

Chairman: R. Maddin

Secretary: C. Dunn

Activation Energy for Recrystallization in Rolled Copper, by B. F. Decker and D. Harker

Recrystallization Reaction Kinetics and Texture Studies of a 50 Iron 50 Nickel Alloy, by W. E. Seymour and D. Harker.

The Textures of Cold-Rolled and Annealed Titanium, by H. T. Clark, Jr.

Relative Energies of Grain Boundaries in Silicon Iron, by C. G. Dunn, F. W. Daniels and M. J. Bolton.

Production and Examination of Zinc Single Crystals, by D. C. Jillson.

RESEARCH IN PROGRESS

Annealing Texture in Rolled Aluminum Strip, by Paul A. Beck and H. Hu.

Afternoon Session

Structure of Alloys

Chairman: B. D. Cullity

Secretary: Earl Parker

Solid Solubility of Cementite in Alpha Iron, by C. A. Wert.

The Structure of Intermediate Phases in Alloys of Titanium With Iron, Cobalt and Nickel, by P. Duwez and J. L. Taylor.

The Alloys of Titanium With Carbon, Oxygen and Nitrogen, by R. I. Jaffee, H. R. Ogden and D. J. Maykuth.

Correlation Between Electrical and Thermal Conductivity in Ni and Ni Alloys, by M. E. Fine.

7:30 P. M.—Tropical Room, Hotel Sheraton

Informal Panel Discussion on Precipitation Hardening

Arranged by M. Cohen

Panel: B. L. Averbach, C. S. Barrett, W. L. Fink, A. H. Geisler, A. Guinien, J. H. Hollomon, R. F. Mehl, C. S. Smith, C. Zener.

Tuesday, Oct. 24

Morning Session

Transformations

Chairman: A. R. Troiano

Secretary: J. B. Hess

On the Martensitic Transformation at Temperatures Approaching Absolute Zero, by S. A. Kulin and M. Cohen.

Austenite Formation During Tempering and its Effects on Mechanical Properties, by E. F. Bailey and W. J. Harris, Jr.

The Isothermal Transformation of a Eutectoid Beryllium Bronze, by R. H. Fillnow and D. J. Mack.

The Ordering Reaction in Cobalt-Platinum Alloys, by J. B. Newkirk, A. H. Geisler, D. L. Martin and R. Smoluchowski.

Morning Session

Properties of Alloys

Chairman: R. M. Parke

Secretary: V. Pulsifer

The Effect of Alloying Elements on the Plastic Properties of Aluminum Alloys, by J. E. Dorn, P. Pietrokowsky and T. E. Tietz.

The Properties of Some Mg-Li Alloys Containing Al and Zn, by R. S. Busk, D. L. Leman and J. J. Casey.

The Effect of Sodium Contamination on Magnesium-Lithium Base Alloys, by P. D. Frost, J. H. Jackson, A. C. Loonam and C. H. Lorig.

Young's Modulus and Its Temperature Dependence in 36 to 52% Nickel-Iron Alloys, by M. E. Fine and W. C. Ellis.

Hydrogen Embrittlement of S.A.E. 1020 Steel, by J. B. Seabrook, N. J. Grant and Dennis Carney.

Aging Characteristics of Magnesium-Lithium-Base Alloys, by P. D. Frost, J. G. Kura and L. W. Eastwood.

Tuesday, Oct. 24

Afternoon Session

Metal-Gas Reactions

Chairman: M. Bever
Secretary: T. Leontis

Equilibrium in the Reaction of Carbon Dioxide With Liquid Copper from 1090° C to 1300° C., by D. J. Girardi and C. A. Siebert.

Hydrogen Solubility in Aluminum and Some Aluminum Alloys, by W. R. Opie and N. J. Grant .

The Vapor Pressure of Silver, by H. M. Schadel, Jr., and C. E. Birchenall.

Composition of Atmospheres Inert to Heated Carbon Steel, by R. W. Gurry.

The Intermittent Oxidation of Some Nickel-Chromium Base Alloys, by B. Lustman.

Afternoon Session

Solidification, Thermal Expansion & Ductility

Chairman: R. S. Busk
Secretary: A. J. Smith

Dendritic Crystallization of Alloys, by B. H. Alexander and F. N. Rhines.

The Supercooling of Aggregates of Small Metal Particles, by D. Turnbull.

The Thermal Expansion Characteristics of Beryllium, by R. M. Treco.

The Ductility of Cast Molybdenum, by R. B. Fischer and J. H. Jackson.

Wednesday, Oct. 25

Afternoon Session

Technical Session on Research in Progress

Arranged by M. Cohen

On the Temperature Dependence of Self-Diffusion in Alpha-Iron, by I. D. Bakalar.

Effect of Uniaxial Compressive Stresses on Self-Diffusion in Alpha-Iron, by F. S. Buffington.

Measurements on the Rate of Secondary Recrystallization in High Purity Silver, by F. D. Rosi and B. H. Alexander.

The Plastic Behavior of Silver Single Crystals at Various Temperatures, by F. D. Rosi.

On the Gamma (259) Planes Habit of Martensite, by E. S. Machlin.

Precementitic Carbides in Tempered Martensite, by E. C. Roberts.

Source of Abnormality in Hypereutectoid Steels, by Arthur Dube.

Yielding in Plain Carbon Steels, by C. S. Roberts and B. L. Averbach.

Afternoon Session

Powder Metallurgy

Chairman: F. V. Lenel
Secretary: J. C. Redmond

A Process for Hot Pressing Beryllium Powder, by A. U. Seybolt, R. M. Linsmayer and J. P. Frandsen.

The Densification of Pre-reduced Copper Powder Compacts in Vacuum and in Hydrogen, by C. B. Jordan and P. Duwez.

RESEARCH IN PROGRESS

Experiments on the Mechanism of Sintering, by B. H. Alexander and R. Balluffi.

Studies on Control of Growth or Shrinkage of Iron-Copper Compacts During Sintering, by J. F. Kuzmick and E. N. Mazza.

Society for Non-Destructive Testing

All meetings at Morrison Hotel Chicago, Oct. 24-26, 1950

Tuesday, Oct. 24

Morning Session

9:30 A. M.—**Fluoroscopic Inspection on Light Metal Alloy Castings,** by Justin G. Schneeman, X-Ray Products, and Tom Piper, Northrop Aircraft.

10:25 A. M.—**Radiography Standards for Al and Mg Castings,** by J. J. Pierce, Navy Ordnance Laboratory, White Oak, Md.

11:15 A. M.—**Correlation of X-Ray and Pressure Tests and Field Service on Nonferrous Castings,** by C. B. Johnson, Rockwell Mfg. Co., and S. A. Brosky, Pittsburgh Testing Laboratory.

Afternoon Session

2:00 P. M.—**Magnetic Particle Inspection of Welded Pipe and Tubing,** by Clark-Peterson-Dunsheath, Magnaflux Corp.

3:00 P. M.—**Symposium on Magnetic Particle Testing.**

Evening Session

8:00 P. M.—**Symposium on Radio-Isotopes,** by G. H. Tenney, U. S. Atomic Energy Commission, Los Alamos.

Wednesday, Oct. 25

Afternoon Session

2:00 P. M.—**Management's View Toward Nondestructive Testing.**

3:00 P. M.—**Place of Nondestructive Testing in Metallurgist's Work.**

4:00 P. M.—**Sonoscopy (Ultrasonic Image Visualization),** by L. W. Ball, U. S. Navy Ordnance Lab., White Oak, Md.

Evening Session

8:00 P. M.—**Symposium on Ultrasonics,** by E. O. Dixon, Ladish Co.

Thursday, Oct. 26

Morning Session

9:30 A. M.—**Supervoltage X-Rays in Industry and Radiological Defense.**

10:25 A. M.—**Use of Betratron for Nondestructive Testing,** by G. D. Adams, University of Illinois.

11:15 A. M.—**Industrial Applications of Particle Radiations.**

Afternoon Session

2:00 P. M.—**Annual Honor Lecture (Mehl),** by R. C. McMaster, Battelle Memorial Institute.

3:00 P. M.—**Annual Business Meeting.**

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Register by Mail—

and save time at the Registration Desk. Clip Advance Registration Form on page 61, and mail to Registration Department, National Metal Exposition, Palmer House, Chicago.

For Hotel Reservations—

Write direct to Miss Betty Lee, Chicago Convention Bureau, Inc., 33 North La Salle St., Chicago 2, Ill.

Complete List of

METAL SHOW EXHIBITORS

International Amphitheatre, Chicago, Oct. 23-27, 1950

Acme Mfg. Co., Detroit. **Booth 218.**
Exhibiting: Automatic welding positioner and work-holding machines.

Acme Steel Co., Chicago. **Booth 623.**
Exhibiting (in operation): Metal stitchers and "production-stitched" samples.

Advance Heating Division, Jensen Specialties, Inc., Detroit. **Booth 2527.** See **Jensen Specialties, Inc.**

Air Reduction Sales Co., New York. **Booth 422.**
Exhibiting (in operation): Flame shape cutting; Aircomatic welding of aluminum and silicon bronze wire on steel; welding stainless steel and aluminum; gas welding torches, tips, regulators and supplies.

Ajax Electric Co., Inc., Philadelphia. **Booth 1501.**
Exhibiting (in operation): Salt bath brazing and processing of typical parts. Sample products ranging from cotter pins to automobile bumpers.

Ajax Electrothermic Corp., Trenton, N. J. **Booth 1501.**
Exhibiting: Electric induction furnaces for melting, forging and heating applications.

Ajax Engineering Corp., Trenton, N. J. **Booth 1501.**
Exhibiting: Electric induction melting furnaces.

Aktiebolaget Kanthal, Hallstahammer, Sweden. **Booth 2428.** See **Kanthal Corp.**

Allen Manufacturing Co., Hartford, Conn. **Booth 702.**
Exhibiting: Hex-Socket screw products.

Allison Co., Bridgeport, Conn. **Booth 1706.**
Exhibiting (in operation): Abrasive cutting wheels for both wet and dry cutting; wet and dry cutting on typical cut-off machines; masonry cutting wheels.

Alloy Engineering & Casting Co., Champaign, Ill. **Booth 1702.**
Exhibiting: Heat resistant and stainless steel castings and furnace parts.

Alox Corp., Niagara Falls, N. Y. **Booth 2441.**
Exhibiting (in operation): Lubricating oil additives for reducing friction, preventing rust, etc.

American Brake Shoe Co., Brake Shoe & Castings Division, New York City. **Booth 2024.**
See also **National Bearing Division, Electro-Alloys Division, Engineered Castings Division, and American Manganese Steel Division.**
Exhibiting: Nickel-chromium white iron castings for abrasive service when little impact is present.

American Brass Co., Waterbury, Conn. **Booth 2002.**
Exhibiting: Copper and copper alloy welding rods. Copper, phosphor bronze and Everdur wire, rods, forgings, sheet, tube and specialty items.

American Chain & Cable Co., Bridgeport, Conn., **Booth 519.** See **Campbell Machine Division** and **Wilson Mechanical Instrument Co.**

American Cyanamid Co., New York City. **Booth 1808.**
Exhibiting (in operation): Improved easy-washing carburizing salt baths; ladle additions for steel.

American "Elin" Corp., New York City. **Booth 2454.**
Exhibiting: Arc welding machinery.

American Forge Division, Chicago. **Booth 2024.** See **American Brake Shoe Co.**

American Gas Association, New York City. **Booth 1017.**
Exhibiting: Information on industrial gas equipment.

American Gas Furnace Co., Elizabeth, N. J. **Booth 1223.**
Exhibiting: Gas furnaces and burners.

American Lava Corp., Chattanooga, Tenn. **Booth 2514.**
Exhibiting: Foundry strainer cores, cut-off cores, gate tubes, brazing jigs and fixtures, insulating beads.

American Machine and Metals, Inc., East Moline, Ill. **Booth 2025.** See **Riehle Testing Machines Division.**

American Machinist, New York City. **Booth 1504.** See **McGraw-Hill Publishing Co., Inc.**

American Manganese Steel Division, American Brake Shoe Co., New York City. **Booth 2024.**
Exhibiting: Welding products for hard facing and repair.

American Metal Market, New York City. **Booth 2644.**
Exhibiting: Specimen copies of *American Metal Market,* daily newspaper of the metal trade.

American Nickeloid Co., Peru, Ill. **Booth 2619.**
Exhibiting: Pre-plated metals in sheets and coils: nickel, chromium, brass, and copper finishes plated to basic metals of steel, zinc, brass, copper or aluminum; finished items employing pre-plated metals.

American Non-Gran Bronze Co., Berwyn, Pa. **Booth 2120.**
Exhibiting: Precision machined parts; bronze castings; Ni-Resist, cast iron and beryllium-copper machined parts.

American Optical Co., instrument Division, Buffalo, N. Y. **Booth 618.**
Exhibiting (in operation): New metallograph, optical projection comparator, stereoscopic binocular microscopes, table-type metallurgical microscopes, and a microcharacter.

American Platinum Works, Newark, N. J. **Booth 1902.**
Exhibiting: Silver brazing products and methods.

American Pullmax Co. Inc., Chicago. **Booth 1714.**
Exhibiting (in operation): Sheet steel and plate cutting machines for straight, circle and irregular design cutting, template cutting, slot cutting, plus beading and folding in metals of all types; wire straightening and cutting machine.

American Silver Co., Inc., Flushing, L. I., N. Y. **Booth 1824.**
Exhibiting: Silver solders; precious metals.

American Society for Metals, Cleveland.
Exhibiting: Technical books and magazines; educational services; market data and statistics on sales opportunities available through periodical publications.

American Society for Metals, Chicago Chapter.
Exhibiting: Educational and technical activities.

American Steel & Iron Works, Chicago. **Booth 1916.**
Exhibiting: Adjustable steel storage racks.

American Wheelabrator & Equipment Co., Mishawaka, Ind. **Booth 1216.**
Exhibiting: Blast cleaning equipment; dust collectors; shot peening equipment.

Anderson Oil Co., F. E., Portland, Conn. **Booth 2225.**
Exhibiting: Metalworking fluids; rust preventives.

Applied Hydraulics, Cleveland. **Booth 1721.** See **Industrial Publishing Co.**

Aronson Machine Co., Arcade, N. Y. **Booth 2427.**
Exhibiting (in operation): Positioners and turning rolls.

Atkins and Co., E. C., Indianapolis, Ind. **Booth 2653.**
Exhibiting (in operation): Power hack saw cutting on various types of machinable steels; metal cutting saws, circular and band; files of all types.

Austenal Laboratories, Inc., Microcast Division, New York City. **Booth 121.**
Exhibiting: Microcastings with close tolerances, soundness and smooth surfaces made in high-temperature alloys, low alloys, S.A.E. steels and toolsteels.

Automotive Industries, Philadelphia. **Booth 2538.**
Exhibiting: Editorial material relating to the latest production techniques employed by automotive manufacturers.

Babcock & Wilcox Co., Refractories Division, New York City. **Booth 2617.**
Exhibiting (in operation): All-mullite firebrick, grain and ramming mix.

Babcock & Wilcox Tube Co., Beaver Falls, Pa. **Booth 2609.**
Exhibiting: Welded and seamless steel tubing.

Baker & Co., Inc., Newark, N. J. **Booth 2215.**
Exhibiting: Industrial and laboratory furnaces; precious metals gauze, sheet, tubing; laboratory ware; electrical contacts.

Baldwin Locomotive Works, Philadelphia. **Booth 407.**
Exhibiting: Metalworking presses; universal testing machines; tensile, fatigue and impact machines; strain gages.

Balmar Corp., N. A. Strand Division, Chicago. **Booth 2635.**
Exhibiting: Flexible shaft machines and accessories.

Bausch & Lomb Optical Co., Rochester, N. Y. **Booth 502.**
Exhibiting: Microscopes and metallographic equipment; spectrographic accessories.

Bede Products Inc., Cleveland. **Booth 2402.**
Exhibiting: Paint heaters; circulating paint heaters; double-unit paint heaters; dip tank heaters.

Bendix-Westinghouse Automatic Air Brake Co., Elyria, Ohio. **Booth 2021.**
Exhibiting (in operation): Industrial air controls used on machine tools, jigs and fixtures.

Bernard Welding Equipment Co., Chicago. **Booth 2638.**
Exhibiting: Weld cleaning hammer; electrode holder; welding clamp; seam-liner.

Beverly Shear Mfg. Co., Chicago. **Booth 2623.**
Exhibiting (in operation): Throatless shears for cutting metal, slitting shears; cable cutters; inside slotters.

Black Drill Co., Cleveland. **Booth 722.**
Exhibiting (in operation): Drills for drilling hardened steel, both wet and dry; air-hydraulic drilling units for high production work on all types of materials.

Blackstone Mfg. Co., Inc., Chicago. **Booth 2552.**
Exhibiting: Power conveyors and belts.

Blakeslee & Co., G. S., Chicago. **Booth 2203.**
Exhibiting: Metal washers and degreasers.

Boker & Sons, V. A., Minneapolis, Minn. **Booth 1715.**
Exhibiting: Precision castings and die castings.

Bradley Washfountain Co,. Milwaukee. **Booth 401.**
Exhibiting (in operation): Washfountains; multi-stall showers; drinking fountains.

Brainard Steel Co., Warren, Ohio. **Booth 2509.**
Exhibiting (in operation): Steel strapping, strapping tools and accessories.

Brown Instrument Division, Philadelphia. **Booth 1802.** See **Minneapolis-Honeywell Regulator Co.**

Bruning Co., Inc., Charles, New York City. **Booth 2666.**
Exhibiting (in operation): Whiteprinters; drafting machines; erasing machine; drafting room furniture and supplies; surveying instruments.

Brush Development Co., Cleveland. **Booth 2536.**
Exhibiting: Surface analyzers; strain analyzers; contour analyzers.

Buehler Ltd., Chicago. **Booth 615.**
Exhibiting (in operation): Sample preparation equipment; presses; mechanical and electrolytic polishers; belt and wheel grinders; abrasive cut-off machines; testing machines; optical equipment.

Bundy Tubing Co., Detroit. **Booth 507.**
Exhibiting: Tubing.

By-Products Steel Co., Division, Coatesville, Pa. **Booth 1625.** See **Lukens Steel Co.**

Campbell Machine Division, American Chain & Cable Co., Bridgeport, Conn. **Booth 519.**
Exhibiting (in operation): Abrasive cut-off machines.

Casting Engineers, Inc., Chicago. **Booth 2648.**
Exhibiting: Precision investment castings.

Champion Rivet Co., Cleveland. **Booth 1830.**
Exhibiting (in operation): Model electrode extrusion press; rivets and welding electrodes.

Chicago Metal Hose Corp., Maywood, Ill. **Booth 714.**
Exhibiting: Flexible metal tubing and hose; expansion joints.

Chicago Rivet & Machine Co., Bellwood, Ill. **Booth 2628.**
Exhibiting (in operation): Automatic rivet setters.

Chicago Screw Co., Bellwood, Ill. **Booth 2627.**
Exhibiting (in operation): Small machined parts for many different kinds of industries; highly finished precision items; hydraulic valve lifters.

Chicago Steel Foundry Co., Chicago. **Booth 2003.**
Exhibiting: Steel castings—a high chromium-nickel heat and corrosion resistant alloy and a low chromium-nickel-molybdenum alloy for resistance to shock and abrasion; a conveyor screw for the heat treating industry.

Chilton Co., Inc., Philadelphia. **Booth 2538.** See **Automotive Industries.**

Cincinnati Milling & Grinding Machines, Inc., Cincinnati, Ohio. **Booth 2534.**
Exhibiting: Flamatic hardening machine.

Cities Service Oil Co., New York City. **Booth 1903.**
Exhibiting: Solvent refined oils, industrial lubricants and specialty products, including rust preventives and rust remover, solvents and core oils; fuel measuring instruments.

Clayton Mark & Co., Evanston, Ill. **Booth 2542.**
Exhibiting: Steel tubing and conduit; pump valves; forged steel unions.

Cleveland Industrial Tool Co., Inc., Cleveland. **Booth 2421.**
Exhibiting: Diamond tools, attachments and accessories.

Climax Molybdenum Co., New York City. **Booth 1724.**
Exhibiting: Technical information and literature on molybdenum.

Clinton Machine Co., Detroit. **Booth 201.** See **Warner Division.**

Coles Cranes, Inc., Chicago. **Booth 1110.**
Exhibiting (in operation): Mobile crane fitted with a 26-ft. boom and a 38-in. magnet.

Combustion Control Corp., Cambridge, Mass. **Booth 1231.**
Exhibiting (in operation): Flame failure safeguard control systems and scanner tube.

Commander Mfg. Co., Chicago. **Booth 402.**
Exhibiting: Drills and chip breakers.

Commercial Shearing & Stamping Co., Youngstown, Ohio. **Booth 2115.**
Exhibiting (in operation): Stampings, forgings, tank heads, tunnel lining products, steel pallets, hydraulic equipment (pumps, valves, cylinders).

Consolidated Engineering Corp., Pasadena, Calif. **Booth 2436.**
Exhibiting (in operation): Oscillograph and associated equipment for the measurement and recording pressure, etc.; leak detector for vacuum and pressure of vibration, stress, strain, acceleration, torque, systems.

Continental Industrial Engineers, Chicago. **Booth 920.**
Exhibiting: Industrial furnaces; special machines; production lines; complete plants including buildings and all equipment.

Contour Marker Corp., Compton, Calif. **Booth 1803.**
Exhibiting: Markers for layout work on pipe and structural steel.

Cooley Electric Mfg. Corp., Indianapolis, Ind. **Booth 2647.**
Exhibiting: Industrial and laboratory electric furnaces.

Copress Corp., Norwalk, Conn. **Booth 1715.**
Exhibiting: Precision castings and die castings.

Crane Packing Co., Chicago. **Booth 2106.**
Exhibiting (in operation): Lapping machines; tube rolling control for expanding of tubing, packings, mechanical seals; plastic lead seal pipe joint and gasket compounds.

Cyc-Arc Limited, Great Britain. **Booth 2654.**
Exhibiting (in operation): Stud welding controllers and tools.

Dake Engine Co., Grand Haven, Mich. **Booth 1210.**
Exhibiting: Hydraulic industrial presses.

Delaware Tool Steel Corp., Wilmington, Del. **Booth 2624.**
Exhibiting: Controlled atmosphere furnace.

Delta Power Tool Division, Rockwell Mfg. Co., Milwaukee. **Booth 2701.**
Exhibiting (in operation): Metalworking and woodworking machine tools: drill presses; air-hydraulic drill units; cut-off machines; grinders; abrasive finishing machines; shapers; spot and arc welders; saws; jointers; planers; lathes.

Department of the Navy, Washington, D. C. **Booth 2903.**

Despatch Oven Co., Minneapolis. **Booth 2747.**
Exhibiting: Heat treating furnaces.

Detrex Corp., Detroit. **Booth 2222.**
Exhibiting (in operation): Industrial metal cleaning equipment and chemicals including solvent-vapor degreasers, degreasing solvents, metal parts washers, alkali cleaning compounds, spray booth coating and water conditioning materials, and rustproofing compounds.

Detroit Testing Machine Co., Detroit. **Booth 314.**
Exhibiting (in operation): Brinell hardness testers; tensile testers; sheet metal (ductility) testers.

Die Castings, Cleveland. **Booth 1721.** See **Industrial Publishing Co.**

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Exhibiting (in operation): Carbon determinator; sulfur determinator; combustion furnaces; boats, liners, shields; Brinell hardness reader; liquid dispensers; pocket hydrometers; particle size classifier.

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NATIONAL METAL EXPOSITION

featuring

HIGH PRODUCTION

Where:

International Amphitheatre
Chicago

When:

Oct. 23 through 27, 1950

Time:

Noon until 10:30 p.m., Monday, Tuesday and Wednesday
10:00 a.m. until 6:00 p.m., Thursday and Friday

Admission by:

Membership card in one of the cooperating societies, or
Invitation from one of the exhibitors, or
Payment of $1.00 registration fee, good for the entire week.

Distillation Products Industries Division, Rochester, N. Y. **Booth 719.**
Exhibiting: Vacuum systems and furnaces; pumps; gages.

Diversey Corp., Chicago. **Booth 619.**
Exhibiting (in operation): Metal cleaning compounds.

DoAll Co., Des Plaines, Ill. **Booth 606.**
Exhibiting (in operation): Line grinding; line milling; cool grinding; production cut-off saw; production high speed saw.

Dow Furnace Co., Detroit. **Booth 2735.**
Exhibiting: Controlled atmosphere furnace and variety of parts processed by this furnace; gas cyaniding.

Dreis & Krump Mfg. Co., Chicago. **Booth 1620.**
Exhibiting: Sheet metalworking machinery; bending brakes; press brakes.

Driver Co., Wilbur B., Newark, N. J. **Booth 115.**
Exhibiting: Electrical resistance alloys in rod, wire and strip form; blow-ups of plant operations.

Du Pont de Nemours & Co., Inc., E. I., Wilmington, Del. **Booth 1602.**
Exhibiting: Electrochemicals and plating supplies.

Du-Wel Metal Products, Inc., Bangor, Me. **Booth 1715.**
Exhibiting: Zinc and aluminum die castings; precision castings.

Eastman Kodak Co., Rochester, N. Y. **Booth 719.** See **Distillation Products Industries Division.**

Eclipse Fuel Engineering Co., Rockford, Ill. **Booth 927.**
Exhibiting (in operation): Gas burners; air-gas mixers; valves; pressed steel pots; furnaces and boilers.

Ekstrand & Tholand Inc., New York City. **Booth 423.**
Exhibiting: Powder metallurgical parts; powder iron.

Elastic Stop Nut Corp. of America, Union, N. J. **Booth 123.**
Exhibiting: Elastic stop nuts and self-locking fasteners.

Electric Furnace Co., Salem, Ohio. **Booth 1011.**
Exhibiting: Gas-fired, oil-fired and electric furnace installations; controlled atmosphere equipment; furnaces for all heat treating purposes.

Electro-Alloys Division, American Brake Shoe Co., Elyria, Ohio. **Booth 2024.**
Exhibiting: Heat, abrasion and corrosion resistant castings.

Elgin National Watch Co., Elgin, Ill. **Booth 318.**
Exhibiting: Abrasive diamond compound; Elgiloy spring alloy; sapphire wire and thread guides, contact points and bearings.

Elox Corp. of Michigan, Clawson, Mich. **Booth 2407.**
Exhibiting: Tapping tools; tap extractor.

Engineered Castings Division, American Brake Shoe Co., Rochester, N. Y. **Booth 2024.**
Exhibiting: Precision iron castings.

Eutectic Welding Alloys Corp., New York City. **Booth 2202.**
Exhibiting: Welding rods and electrodes.

Farmers Engineering & Mfg. Co., Pittsburgh. **Booth 2723.**
Exhibiting (in operation): A model steel mill demonstrating use of industrial communication equipment. Samples of equipment.

Fawick Airflex Co., Inc., Cleveland. **Booth 1521.**
Exhibiting: Industrial clutches and seals; valves; brakes.

Ferner Co., Inc., R. Y., Malden, Mass. **Booth 214.**
Exhibiting (in operation): Fatigue testing machine; metallurgical microscopes and photomicrographs; portable hardness testers.

Fisher Scientific Co., Pittsburgh. **Booth 2753.**
Exhibiting (in operation): Induction carbon apparatus for carbon determinations; the Steelsorter, an electronic instrument designed to separate mixed steels, other laboratory appliances.

Finkl & Sons Co., A., Chicago. **Booth 1911.**
Exhibiting: Pictures and furniture. (Die blocks; hammer and press forgings.)

Flow, Cleveland. **Booth 1721.** See **Industrial Publishing Co.**

Foster Transformer Co., Cincinnati, Ohio. **Booth 2465.**
Exhibiting: D.C. arc welding machine control unit.

Fostoria Pressed Steel Corp., Fostoria, Ohio **Booth 718.**
Exhibiting: Infrared heating equipment; industrial lighting units.

Foundry, Cleveland. **Booth 1925.** See **Penton Publishing Co.**

Gamma Scientific Co., Great Neck, L. I., N. Y. **Booth 418.**
Exhibiting (in operation): Metallographic microscopes; photomicrographic equipment; portable electric polishers; low-power and polarizing microscopes.

Gas Appliance Service, Inc., Chicago. **Booth 925.**
Exhibiting: Gas-air mixers; high speed burners; small furnaces; air heaters.

General Alloys Co., Boston. **Booth 906.**
Exhibiting: Heat resisting alloy castings and furnace mechanisms; stainless steel castings.

General Aniline and Film Corp., Johnson City, N. Y. **Booth 1527.** See **Ozalid Division**

Goldsmith Bros. Smelting & Refining Co., Chicago. **Booth 2419.**
Exhibiting: Precious metals and allied products.

Goodrich Co., B. F., Akron, Ohio. **Booth 2007.**
Exhibiting (in operation): The Rivnut, a one-piece blind rivet, with threads.

Gordon Co., Claud S., Chicago. **Booth 925.**
Exhibiting: Temperature control units; furnace atmosphere indicators; box furnaces; thermocouples, insulation and lead wire, protective tubes.

H & H Tube & Mfg. Co., Detroit. **Booth 1707.**
Exhibiting: Seamless brass and copper tubing; lock-seam tubing; strip.

Hacker, Inc., William J., New York City. **Booth 2453.**
Exhibiting: Optical instruments manufactured by Reichert Optical Works, Vienna, Austria.

Hamilton Mfg. Co., Two Rivers, Wis. **Booth 2727.**
Exhibiting: Wood and steel drafting tables; wood and steel blueprint files.

Handy & Harman, New York City. **Booth 1606.**
Exhibiting (in operation): Silver brazing by induction heat and torch; typical brazed parts.

Harnischfeger Corp., Milwaukee. **Booth 208.**
Exhibiting: Arc welders; positioners; materials handling equipment.

Harper Electric Furnace Corp., Niagara Falls, N. Y. **Booth 2554.**
Exhibiting: Protographs of heat treating, sintering, and melting furnaces.

Hayes, Inc., C. I., Providence, R. I. **Booth 306.**
Exhibiting: Controlled atmosphere furnaces; electric heat treating equipment.

Haynes Stellite Division, Union Carbide and Carbon Corp., Kokomo, Ind. **Booth 901.**
Exhibiting (in operation): Mechanized hard facing by the oxyacetylene process; plastic patterns for precision investment casting; hard facing materials, metal-cutting tools, corrosion resistant alloys and high-temperature alloys.

Heli-Coil Corp., Long Island City, N. Y. **Booth 2442.**
Exhibiting (in operation): Use of Heli-Coil inserts for protecting and strengthening screw threads.

Heppenstall Co., Pittsburgh. **Booth 2634.**
Exhibiting: Forgings; shear knives; die blocks.

Hesse Machine & Mfg. Co., West Hartford, Conn. **Booth 2415.** See **Metal Products Sales Co.**

Hevi Duty Electric Co., Milwaukee. **Booth 1931.**
Exhibiting: Industrial electric heat treating furnaces; laboratory furnaces; heating units; dry-type transformers.

Hitchiner Mfg. Co., Inc., Manchester, N. H. **Booth 2415.** See **Metal Products Sales Co.**

Holcroft & Co., Chicago. **Booth 614.**
Exhibiting: Modern heat treating equipment: Rotary furnaces; continuous and batch-type furnaces; radiant tube heating (gas-fired or electric).

Hones, Inc., Charles A., Baldwin, L. I. N. Y. **Booth 1029.**
Exhibiting: Gas-fired oven furnaces, muffle furnaces and pot furnaces; gas burners.

Houghton & Co., E. F., Philadelphia. **Booth 728.**
Exhibiting (in operation): Heat treating demonstration using liquid salt baths; heat treating and metal working products, including drawing compounds, cutting oils, rust preventives, carburizers, cleaners, etc.

Howard Foundry Co., Chicago. **Booth 101.**
Exhibiting: Castings, sand and permanent mold, of aluminum, brass, bronze, magnesium and semi-steel.

Hydropress, Inc., New York City. **Booth 2717.**
Exhibiting: Hydraulic presses; die-casting machines.

Illinois Testing Laboratories, Inc., Chicago. **Booth 819.**
Exhibiting (in operation): Indicating and controlling pyrometers; air velocity measuring instruments; dew point measuring instruments.

Industrial Heating, Pittsburgh. **Booth 2523.** See **National Industrial Publishing Co.**

Industrial Press (Machinery) New York City. **Booth 1924.**
Exhibiting: Blow-ups of machine tool operations; engineering books and periodicals.

Industrial Publishing Co., Cleveland. **Booth 1721.**
Exhibiting: Magazines: *Industry and Welding; Die Castings; Flow; Applied Hydraulics.*

Industrial Southern California, Los Angeles. **Booth 815.**
Exhibiting: Opportunities for industry in Southern California.

Industry and Welding, Cleveland. **Booth 1721.** See **Industrial Publishing Co.**

International Nickel Co., New York City. **Booth 1107 and 1120.**
Exhibiting: Properties and applications of 20 widely used alloys containing nickel.

Interstate Machinery Co., Chicago. **Booth 1206.**
Exhibiting: Rebuilt machinery.

Ipsen Industries, Inc., Rockford, Ill. **Booth 715.**
Exhibiting: Automatic heat treating units; generators; sample heat treated parts.

Iron Age, New York City. **Booth 826.**
Magazines and reprints.

Jarrell-Ash Co., Boston. **Booth 129.**
Exhibiting (in operation): Self-contained spectrograph, source unit, microphotometer combination for the analysis of nonferrous metals; quartz and glass spectrograph; high-powered source unit; comparator microphotometer; Hilger-X-ray diffraction unit with accessory cameras.

Jensen Specialties, Inc., Detroit. **Booth 2527.**
Exhibiting (in operation): New prefabricated type electric oven suitable for large or small industrial applications in the 200° F. to 700° F. temperature range; self-lubricating monorail conveyer.

Johnson & Son, Inc., S. C., Racine, Wis. **Booth 2544.**
Exhibiting: Protective wax coatings for metals.

Jones Co., C. Walker, Philadelphia. **Booth 2121.**
Exhibiting: Industrial work gloves.

K S M Products Inc., Stud Welding Division, Merchantville, N. J. **Booth 2733.**
Exhibiting (in operation): Studs for electric arc welding; equipment for stud welding process.

Kalamazoo Tank & Silo Co., Kalamazoo, Mich. **Booth 1210.** See **Marvin Machine Products Co.**

Kanthal Corp., Southport, Conn. **Booth 2428.**
Exhibiting: Electric resistance wire; high-temperature alloys. Heating elements and resistance alloys.

Kellogg Division, Rochester, N. Y. **Booth 2024.** See **American Brake Shoe Co.**

Kemp Mfg. Co., C. M., Baltimore, Md. **Booth 1227.**
Exhibiting: Industrial gas carburetors; gas burners; immersion heating.

Kennametal, Inc., Latrobe, Pa. **Booth 808.**
Exhibiting: Metal cutting tools; wear resistant parts.

Kerns Co., L. R., Chicago. **Booth 2122.**
Exhibiting: Industrial lubricants.

King, Andrew, Narberth, Pa. **Booth 706.**
Exhibiting: Portable Brinell hardness tester.

Kold-Hold Manufacturing Co., Lansing, Mich. **Booth 2208.**
Exhibiting (in operation): Platecoils which replace pipe coils, for heating or cooling tanks.

Korn, Inc., William, New York City. **Booth 2602.**
Exhibiting: Metal marking crayons.

Kux Machine Co., Chicago. **Booth 2212.**
Exhibiting: Die-casting machines; powder metal presses.

Laboratory Equipment Corp., St. Joseph, Mich. **Booth 2726.**
Exhibiting: Carbon and sulphur determination equipment; laboratory furnaces and equipment.

Lapeer Mfg. Co., Detroit. **Booth 2453.**
Exhibiting: Clamps and pliers.

Leeds & Northrup Co., Philadelphia. **Booth 1624.**
Exhibiting: New design air-fuel ratio controller; Homocarb carburizing furnace with control of carbon content of the atmosphere; automatic recording of weights of foundry sand mixtures using strain gages with Speedomax recorder; immersion thermocouple pyrometer for openhearth baths; roll temperature recording equipment.

Lepel High Frequency Laboratories, Inc., New York City. **Booth 2221.**
Exhibiting: High-frequency induction heating equipment.

Leslie Welding Co., Chicago. **Booth 2741.**
Exhibiting (in operation): Hand press for short-run blanking operations; welding services.

Lewis Machine Co., Cleveland. **Booth 2610.**
Exhibiting (in operation): Wire straightening and cutting machines.

Lincoln Electric Co., Cleveland. **Booth 1201.**
Exhibiting (in operation): Manual hidden-arc welding equipment.

Lindberg Engineering Co., Chicago. **Booth 1204.**
Exhibiting: Heat treating furnaces; blowers; hydraulic equipment.

Lindberg Steel Treating Co., Chicago. **Booth 2015.**
Exhibiting: Hydrogen and atmosphere heat treating; case hardening of stainless steels; various unusual heat treat methods.

Linde Air Products Co., New York City. **Booth 901.**
Exhibiting: Gas welding and cutting equipment.

Lipe-Rollway Corp., Syracuse, N. Y. **Booth 2549.**
Exhibiting: Portable power hacksaw machines.

Liquid Carbonic Corp., Chicago. **Booth 1815.**
Exhibiting: Gas welding and cutting equipment and supplies.

Lithium Co., Newark, N. J. **Booth 2719.**
Exhibiting: Lithium atmosphere heat treating and forging furnaces.

Lord Manufacturing Co., Erie, Pa. **Booth 1807.**
Exhibiting (in operation): Vibration-control mountings; bonded-rubber (rubber-bonded-to-metal) component parts.

Los Angeles Chamber of Commerce, Los Angeles. **Booth 815.** See **Industrial Southern California.**

Los Angeles Department of Water & Power. Booth 815. See **Industrial Southern California.**

Lukens Steel Co., Coatesville, Pa. **Booth 1625.**
Exhibiting: Clad steels (nickel, stainless, monel and inconel); flame-cut, sheared, bent, pressed and blanked parts; jacketed steel equipment; weldments.

Lynchburg Foundry Co., Lynchburg, Va. **Booth 2517.**
Exhibiting: Cast iron pipe and fittings.

Machine Design, Cleveland. **Booth 1925.** See **Penton Publishing Co.**

Machinery, New York City. **Booth 1924.** See **Industrial Press.**

Magnaflux Corp., Chicago. **Booth 2012.**
Exhibiting (in operation): Nondestructive testing equipment and methods: automatic conveyorized Magnaflux unit; Zyglo; ultrasonic thickness measurement instrument; brittle coating for experimental stress analysis.

Magnetic Analysis Corp., Long Island City, N. Y., **Booth 1920.**
Exhibiting (in operation): Magnetic analysis equipment for inspection; comparators; demagnetizer.

Makepeace Co., D. E., Attleboro, Mass. **Booth 1732.**
Exhibiting: Gold, silver and gold-filled sheet, wire and tubing.

Manhattan Rubber Division, Passaic, N. J. **Booth 2130.**
Exhibiting: Abrasive disks; rubber and resinoid-bonded grinding and cutting wheels; diamond wheels.

Marlie Trading, Inc., New York City. **Booth 2449.**
Exhibiting: Bandsaw blades; coping saws; hacksaws.

Martindale Electric Co., Cleveland. **Booth 1811.**
Exhibiting: Rotary files and burs; circular metal cutting saws; equipment for electric motor sand generators, mechanical maintenance equipment; electrical testing instruments, protective dust mask.

Marvin Machine Products, Inc., Detroit. **Booth 1210.**
Exhibiting (in operation): Small milling machines and milling machine units.

Master Builders Co., Cleveland. **Booth 2547.**
Exhibiting: Industrial floors and heavy equipment grouts.

Material Handling Division, Jensen Specialties, Inc., Detroit. **Booth 2527.** See **Jensen Specialties, Inc.**

Materials & Methods, New York City. **Booth 1524.** See **Reinhold Publishing Corp.**

McGraw-Hill Publishing Co., Inc., New York City. **Booth 1504.**
Exhibiting: Publications: *American Machinist; Product Engineering; Welding Engineer.*

Merrill Bros., Maspeth, N. Y. **Booth 416.**
Exhibiting (in operation): Material handling devices such as hand grips, lifters, lifting clamps, drum tilters.

Metal Parts and Equipment Co., Chicago. **Booth 1514.** See **Mir-O-Col Alloy Co., Inc.**

Metal Products Sales Co., West Hartford, Conn. **Booth 2415**
Exhibiting: Precision investment castings; die castings.

Metal Progress, Cleveland. See **American Society for Metals.**

Metals Review, Cleveland. See **American Society for Metals.**

Michiana Products Corp., Michigan City, Ind. **Booth 2618.**
Exhibiting: Stainless, heat resistant and abrasion resistant castings.

Miller Electric Mfg. Co., Appleton, Wis. **Booth 1731.**
Exhibiting: Heliarc welders; spot welders; arc welders; welding generators.

Milne & Co., A., New York City. **Booth 2448.**
Exhibiting: Hollow die steel and graphitic toolsteels; representative products.

Microcast Division, Austenal Laboratories. Inc., New York City. **Booth 121.** See **Austenal Laboratories, Inc.**

Minneapolis-Honeywell Regulator Co., Philadelphia. **Booth 1802.**
Exhibiting (in operation): Industrial instruments and controls.

Mir-O-Col Alloy Co., Inc., Los Angeles. **Booth 1514.**
Exhibiting: Hard facing alloys.

Morganite Inc., Long Island City, N. Y. **Booth 2737.**
Exhibiting: A special line of refractory ware consisting of high-temperature tubes for analysis by combustion, pyrometry, high-temperature heat treatment; crucibles in recrystallized alumina; pure oxide ware in thoria, magnesia and zircon.

Morton Gregory Corp., Lorain, Ohio. **Booth 2559.** See **Nelson Stud Welding Division.**

National Bearing Division, American Brake Shoe Co., St. Louis, Mo. **Booth 2024.**
Exhibiting: Brass, bronze and copper bearings and castings, cored and solid bars, babbitt metal and aluminum castings.

National Carbon Div., Union Carbide & Carbon Corp., New York City. **Booth 901.**
Exhibiting: Graphite ingot stool inserts and graphite molds; carbon blast furnace lining; electrodes for electric furnaces; carbon-graphite and metal-graphite brushes for motors or generators; carbon brick; tubular heat exchangers; pipe and fittings.

National Cored Forgings Co., Inc., New York City. **Booth 2123.**
Exhibiting: Cored nonferrous forgings.

National Diamond Laboratory, New York City. **Booth 2447.**
Exhibiting (in operation): Boring bar arrangement for mechanical holding of industrial diamonds; high-nickel bond for small-diameter diamond-impregnated quill wheels; industrial diamond setting machine; resinoid-bonded industrial diamond honing stones.

National Industrial Publishing Co., Pittsburgh. Booth 2523.
Exhibiting: Copies of magazine *Industrial Heating.*

National Lead Co., New York City. **Booth 1917.**
Exhibiting: Kirksite dies; solders and fluxes; babbitt metals.

National Radiator Co., Johnstown, Pa. **Booth 414.** See **Plastic Metals Division.**

National Research Corp., Cambridge, Mass. **Booth 1816.**
Exhibiting (in operation): High-vacuum cast and treated metals; laboratory-type high-vacuum furnace; component parts of vacuum systems.

National Spectrographic Laboratories, Cleveland. **Booth 129.** See **Jarrell-Ash Co.**

Navy Department, Washington, D. C. **Booth 2903.** See **Department of the Navy.**

Nelson Stud Welding Division, Morton Gregory Corp., Lorain, Ohio. **Booth 2559.**
Exhibiting: Stud welding equipment.

New Equipment Digest, Cleveland. **Booth 1925.** See **Penton Publishing Co.**

New Jersey Zinc Co., New York City. **Booth 2103.**
Exhibiting: Zinc die castings and pressed powder parts of brass, bronze and nickel silver; also finished products.

North American Philips Co., Mt. Vernon, N. Y. **Booth 528.**
Exhibiting: X-ray diffraction equipment and cameras; Geiger-counter X-ray spectrometer goniometer; Geiger-counter tubes and other equipment for isotope research.

Nox-Rust Chemical Corp., Chicago. **Booth 2643.**
Exhibiting: Rust inhibited wrapper for packaging of metal parts; rust preventive compounds.

Oakite Products, Inc., New York City. **Booth 322.**
Exhibiting: Metal cleaning materials; rust and scale removers; rust preventives; paint strippers.

Ohio Crankshaft Co., Cleveland. **Booth 910.**
Exhibiting (in operation): Master induction heating station; high-frequency induction heating electronic set; vertical motor-generator set.

Ohio Seamless Tube Co., Shelby, Ohio. **Booth 109.**
Exhibiting: Seamless and electric welded steel tubing: straight sections, fabricated and forging samples.

Olin Industries, Inc., East Alton, Ill. **Booth 2502.** See **Western Brass Mills.**

Olsen Testing Machine Co., Tinius, Willow Grove, Pa. **Booth 629.**
Exhibiting: Universal testing machines.

O'Neil-Irwin Mfg. Co., Lake City, Minn. **Booth 1603.**
Exhibiting: Hand-operated benders, shears, notchers, punches.

Optimus Equipment Co., Matawan, N. J. **Booth 1732.**
Exhibiting: Vapor degreasers; power spray washers; stills.

Osborn Mfg. Co., Cleveland. **Booth 319.**
Exhibiting: Power-driven brushes; strip brushes; paint and varnish brushes.

Ozalid, Division of General Aniline and Film Corp., Johnson City, N. Y. **Booth 1527.**
Exhibiting (in operation): Print making equipment; copying techniques.

Pangborn Corp., Hagerstown, Md. **Booth 2560.**
Exhibiting (in operation): Liquid blast cleaning machine; portable blast machine; wet blast machine; soft abrasive blast cleaning machine; sample workpieces.

Park Chemical Co., Detroit. **Booth 1202.**
Exhibiting: Steel treating materials and chemicals.

Parker-Kalon Corp., New York City. **Booth 2418.**
Exhibiting: Self-tapping screws (thread-cutting and thread-forming).

Partlow Corp., New Hartford, N. Y. **Booth 818.**
Exhibiting (in operation): Indicating and non-indicating temperature controls; time-temperature recording controllers; throttling type of controls; safety pilot; timers and accessories.

Pease Co., C. F., Chicago. **Booth 2228.**
Exhibiting (in operation): Continuous automatic white-printing machine.

Penton Publishing Co., Cleveland. **Booth 1925.**
Exhibiting: Publications: *Steel; Foundry; Machine Design; New Equipment Digest;* technical books.

Phillips Mfg. Co., Chicago. **Booth 2031.**
Exhibiting (in operation): Vapor degreasers; monorail degreaser.

Physicists Research Co., Ann Arbor, Mich. **Booth 2566.**
Exhibiting (in operation): Profilometer equipment for shop measurement of surface roughness.

Pines Engineering Co., Aurora, Ill. **Booth 2410.**
Exhibiting: Tube fabricating and bending machinery.

Plastic Metals Division, National Radiator Co., Johnstown, Pa. **Booth 414.**
Exhibiting: Metal powders and their applications, including electrolytic iron, sponge iron, nickel, manganese and silicon.

Platecoil Division, Kold-Hold Mfg. Co., Lansing, Mich. **Booth 2208.** See **Kold-Hold Mfg. Co.**

Powdered Metal Products Corp. of America, Franklin Park, Ill. **Booth 2642.**
Exhibiting: Structural parts, such as gears, cams, ratchets, etc., as well as electrical and magnetic parts made by the powdered metal process in both ferrous and nonferrous alloys.

Precision Extrusions, Bensenville, Ill. **Booth 2424.**
Exhibiting: Extruded metals.

Precision Shapes Inc., Suffern, N. Y. **Booth 2524.**
Exhibiting: Products manufactured by patented continuous milling process.

Precision Welder & Machine Co., Cincinnati, Ohio. **Booth 429.**
Exhibiting: Spot welding equipment.

Pressco Castings & Mfg. Corp., Chicago. **Booth 1715.**
Exhibiting: Die castings and precision castings.

Pressed Metal Institute, Cleveland. **Booth 2445.**
Exhibiting: Information on metal stampings.

Product Engineering, New York City. **Booth 1504.** See **McGraw-Hill Publishing Co.**

Production Machine Co., Greenfield, Mass. **Booth 1817.**
Exhibiting (in operation): High-speed centerless polishing and buffing machine; duplex centerless polishing, buffing and superfinishing machine.

Pyrometer Instrument Co., Inc., Bergenfield, N. J. **Booth 302.**
Exhibiting: Optical, radiation, surface and immersion pyrometers.

Radio Corp. of America, Camden, N. J. **Booth 514.**
Exhibiting (in operation): Electronic power generators for high frequency soldering, brazing, heat treating; new permanent magnet electron microscope.

Ransome Machinery Division, Dunellen, N. J. **Booth 506.** See **Worthington Pump and Machinery Corp.**

Rapids-Standard Co., Inc., Grand Rapids, Mich. **Booth 2457.**
Exhibiting (in operation): Cold forged casters; steel forged, flame-hardened casters; gravity conveyors; portable power belt conveyor.

Raybestos-Manhattan, Inc., Passaic, N. J. **Booth 2130.** See **Manhattan Rubber Mfg. Division.**

Raytheon Manufacturing Co., Waltham, Mass. **Booth 2548.**
Exhibiting (in operation): Press-type bench-mounted welding head; controlled voltage condenser discharge type of power supplies; complete packaged a.c. resistance welding control.

Reeves Pulley Co., Columbus, Ind. **Booth 2020.**
Exhibiting (in operation): Variable speed control equipment.

Reinhold Publishing Corp., New York City, **Booth 1524.**
Exhibiting: *Materials & Methods,* the magazine of materials engineering; technical and scientific books.

Revere Copper and Brass Inc., New York City. **Booth 108.**
Exhibiting: examples of varied applications of copper, copper alloys, and aluminum.

Reynolds Metals Co., Louisville, Ky. **Booth 1211.**
Exhibiting: Aluminum alloys and fabricated parts.

Richards Co., J. A., Kalamazoo, Mich. **Booth 1914.**
Exhibiting (in operation): Benders and cutters for production of irregular shaped metal parts.

Riehle Testing Machines Division, American Machine and Metals, Inc., East Moline, Ill. **Booth 2025.**
Exhibiting (in operation): Universal hydraulic testing machine; universal screw power testing machine; portable Rockwell hardness tester; various testing instruments.

Riverside Metal Co., Riverside, N. J. **Booth 406.**
Exhibiting: Wrought nonferrous alloys: phosphor bronze, nickel silver, cupronickel, beryllium-copper.

Roberts Co., C. A., Chicago. **Booth 2435.** See **Superior Tube Co.**

Rockwell Mfg. Co., Milwaukee. **Booth 2701.** See **Delta Power Tool Division.**

Rolock Inc., Fairfield, Conn. **Booth 522.**
Exhibiting: Heat and corrosion resisting alloy equipment: muffles, retorts, racks, fixtures, screens, boxes, trays, etc. for heat treating and metal finishing.

Ruemelin Mfg. Co., Milwaukee. **Booth 2114.**
Exhibiting (in operation): Welding fume collector; sand blast cabinet; tubular cloth dust filter.

Ryerson & Son, Inc., Joseph T., Chicago. **Booth 1016.**
Exhibiting: Alloy steel stocks and service.

Safety Clothing & Equipment Co., Cleveland. **Booth 2535.**
Exhibiting: Aprons, clothing, curtains, gloves, leggings, sleeves made of asbestos, chrome leather and fireproofed duck.

Safety First Shoe Co., Holliston, Mass. **Booth 2520.**
Exhibiting: Safety steel-toe footwear.

Sales Service Machine Tool Co., St. Paul, Minn. **Booth 1720.**
Exhibiting (in operation): Power presses; shaper; power hack saws.

Salkover Metal Processing of Illinois, Chicago. **Booth 1814.**
Exhibiting: Examples of copper brazed assemblies used in many different types of products including the automotive, aircraft, home appliance and innumerable other industries. Examples of silver brazed and aluminum brazed assemblies; aluminum to steel brazing method.

Schmidt, Inc., George T., Chicago. **Booth 2124.**
Exhibiting: Marking tools and marking machinery.

Schrader's Son, A., Brooklyn, N. Y. **Booth 518.**
Exhibiting: Air cylinders, operating valves, and pneumatic accessories.

Sciaky Bros., Inc., Chicago. **Booth 215.**
Exhibiting: Resistance welding machines.

Scott & Son, Inc., C. U., Rock Island, Ill. **Booth 1235.**
Exhibiting: Parts made of stainless steel and heat treated by Super Scottsonizing.

Scovill Mfg. Co., Inc., Brooklyn, N. Y. **Booth 518.** See **A. Schrader's Son.**

Selas Corp. of America, Philadelphia. **Booth 1127.**
Exhibiting: Heating furnaces and burners; Gradiation heating.

Sentry Co., Foxboro, Mass. **Booth 602.**
Exhibiting (in operation): Sentry furnace in operation with the diamond block method of atmospheric control; tube combustion furnace; diamond blocks and accessories.

Shell Oil Co., New York City. **Booth 315.**
Exhibiting: Industrial lubricants; cutting oils, drawing compounds, industrial greases.

Sherman & Co., Flushing, N. Y. **Booth 1824.**
Exhibiting: Silver brazing alloys and fluxes.

Sinclair Refining Co., Chicago. **Booth 2533.**
Exhibiting: Industrial oils and greases.

Smith Welding Equipment Corp., Minneapolis. **Booth 2518.**
Exhibiting (in operation): Welding torches, accessories and special purpose tips.

Socony-Vacuum Oil Co., Inc., New York City. **Booth 2510.**
Exhibiting: Cutting and grinding oils; lubricants.

South Florida Test Service, Miami, Fla. **Booth 2620.**
Exhibiting (in operation): Corrosion exposure facilities at inland proving grounds and salt atmospheric base.

Southern California Edison Co., Ltd., Los Angeles. **Booth 815.** See **Industrial Southern California.**

Special Welding Alloy Co., Inc., Long Island City, N. Y. **Booth 2454.**
Exhibiting: Welding rods and fluxes.

Spencer Turbine Co., Hartford, Conn. **Booth 1019.**
Exhibiting (in operation): Multi-stage centrifugal-type turbo-compressors and gas boosters.

Sperry Products, Inc., Danbury, Conn. **Booth 228.**
Exhibiting: Reflectoscope and Reflectogage—ultrasonic instruments for detection of flaws and measuring thickness.

Standard American Eng. Co., Lyons, Ill. **Booth 2743.**
Exhibiting: Combined radiation and convection pit-type general purpose heat treating furnace.

Standard Electric Tool Co., Cincinnati, Ohio. **Booth 2102.**
Exhibiting: Grinding machines; buffing and polishing lathes; carbide tool grinders; abrasive belt machines.

Standard Pressed Steel Co., Jenkintown, Pa. **Booth 2434.**
Exhibiting: Cap screws, set screws, pressure plugs, dowel pins, shoulder screws; self-locking nuts; steel shaft collars; steel shop equipment—work benches, portable tool stands, trucks, dollies, foreman's desk.

Starrett Co., L. S., Athol, Mass. **Booth 2438.**
Exhibiting: Mechanic's hand measuring tools and precision instruments; steel tapes; precision ground flat stock; dial indicators; hacksaws; band saws and band knives.

Steel, Cleveland. **Booth 1925.** See **Penton Publishing Co.**

Steel City Testing Machines, Inc., Detroit. **Booth 2519.**
Exhibiting: Universal, tensile, hardness, ductility, compression testing machines; hydrostatic and special testing machines.

Steel Equipment & Maintenance News, Pittsburgh.
Exhibiting: Publications.

Steel Parts Mfg. Co., Chicago. **Booth 2552.**
Exhibiting (in operation): Various types of conveyors: belt conveyors, vertical and horizontal; roller; skate wheel; roller bed belt conveyors.

Stimpson Co., Inc., Edwin B., Brooklyn, N. Y. **Booth 1820.**
Exhibiting (in operation): Eyelets, rivets, stampings, terminals, arrows and hands, screw machine parts, washers, grommets, ferrules, posts and screws, hole plugs, snap fasteners; various attaching machines and rivet setting machines.

Stokes Machine Co., F. J., Philadelphia. **Booth 420.**
Exhibiting (in operation): Powder metal press and typical parts produced.

Stoody Co., Whittier, Calif. **Booth 1615.**
Exhibiting (in operation): Submerged-arc rebuilding and hard facing of tractor parts; hard metal castings; manually and automatically hard faced parts of various kinds.

Strand Division, N. A., Chicago. **Booth 2635.** See **Balmar Corp.**

Streeter-Amet Co., Chicago. **Booth 2715.**
Exhibiting (in operation): Scientific and industrial counters; time interval recorders; traffic counters.

Stuart Oil Co., Ltd., D. A., Chicago. **Booth 328.**
Exhibiting: Cutting and grinding oils.

Stud Welding Division, K S M Products, Inc., Merchantville, N. J. **Booth 2733.** See **K S M Products, Inc.**

Superior Tube Co., Norristown, Pa. **Booth 2435.**
Exhibiting (in operation): Model draw bench; carbon, alloy and stainless steel, nickel and nickel alloy and beryllium-copper tubing; samples of finished products utilizing tubing.

Surface Combustion Corp., Toledo, Ohio. **Booth 1106.**
Exhibiting: Heat treating equipment for high-speed heating for forging, clean hardening, gas carburizing, carbon restoration, dry cyaniding, malleableizing, homogeneous carburizing, convection heating for tempering, and other processes.

Technical Metal Processing, Inc., Cleveland. **Booth 1814.** See **Salkover Metal Processing of Illinois.**

Tempil Corp., New York City. **Booth 515.**
Exhibiting (in operation): Temperature-indicating crayons, pellets, and paint.

Tennant Co., G. H., Minneapolis, Minn. **Booth 2528.**
Exhibiting (in operation): Heavy-duty industrial floor machines (vacuum equipped, drum type); power sweepers.

Texas Co., New York City. **Booth 1906.**
Exhibiting: Cutting lubricants and coolants.

Timken Roller Bearing Co., Canton, Ohio. **Booth 1006.**
Exhibiting (in operation): Products manufactured from alloy steel and seamless steel tubing, including a turbo-jet engine, an oilfield pump, fishing rods, golf shafts, automatic transmissions.

Tin Research Institute, Inc., Columbus, Ohio. **Booth 2565.**
Exhibiting: Information on production, consumption, properties and applications of tin.

Tincher Products Co., Sycamore, Ill. **Booth 2641.**
Exhibiting: Process for recovery of porous castings; products for repairing cracked engine blocks.

Tinnerman Products, Inc., Cleveland. **Booth 1825.**
Exhibiting: Fasteners — Speednuts, Speedclips and Speedclamps.

Titanium Metals Corp. of America, New York City. **Booth 2207.**
Exhibiting: Titanium and titanium alloys.

Tocco Division, Cleveland. **Booth 910.** See **Ohio Crankshaft Co.**

Toolskill Co., Chicago. **Booth 2636.** See **Vlier Mfg. Co.**

Torit Mfg. Co., St. Paul. **Booth 2537.**
Exhibiting (in operation): Dust collectors for grinders, polishing machines, etc.

Tracerlab, Inc., Boston. **Booth 2420.**
Exhibiting: Radioactive instruments.

Tyler Mfg. Co., New York City. **Booth 2449.** See **Hakim, Lawrence, Circurel, Inc.**

Udylite Corp., Detroit. **Booth 907.**
Exhibiting (in operation): Automatic plating machine equipped with loader, unloader and conveyer.

Union Carbide and Carbon Corp., New York City. **Booth 901.** See **Haynes Stellite Division, Linde Air Products Co., and National Carbon Division.**

U. S. Electrical Motors, Inc., Los Angeles. **Booth 2637**
Exhibiting (in operation): Electrical motors and power drives.

U. S. Navy, Washington, D. C. **Booth 2903.** See **Department of the Navy.**

U. S. Pipe & Foundry Co., Burlington, N. J. **Booth 803.**
Exhibiting: Cast iron pipe and fittings; gray iron castings.

Universal Castings Corp., Chicago. **Booth 2724.**
Exhibiting: Plaster mold nonferrous castings.

Univertical Machine Co., Detroit. **Booth 2712.**
Exhibiting: Hand tools.

Verson Allsteel Press Co., Chicago. **Booth 122.**
Exhibiting (in operation): Open-back inclinable press with hydraulic bolster; small press brake; collection of stampings.

Vlier Mfg. Co., Los Angeles. **Booth 2636.**
Exhibiting (in operation): Torque thumb screws; spring plungers; spring stops; fixture keys.

Wallace Supplies Mfg. Co., Chicago. **Booth 114.**
Exhibiting: Power and hand-operated bending machines.

Warner Division, Clinton Machine Co., Detroit. **Booth 201.**
Exhibiting (in operation): Disintegrating machine for repairing carbide and steel dies and for removing broken heads, tools, taps, drills, etc.

Welding Engineer, New York City. **Booth 1504.** See **McGraw-Hill Publishing Co., Inc.**

Wells, Inc., Martin, Los Angeles. **Booth 2541.**
Exhibiting: Electrode holders, valve seats for industrial engines.

Wells Mfg. Corp., Three Rivers, Mich. **Booth 2708.**
Exhibiting: Metal cutting bandsaw machines.

Western Brass Mills, East Alton, Ill. **Booth 2502.**
Exhibiting: Brass and other copper alloys in sheet, strip, long coils, fabricated or drawn parts.

Westinghouse Electric Corp., Pittsburgh. **Booth 622.**
Exhibiting: Welding machines; high-frequency equipment; welding electrodes; magnetic materials; heat resisting alloys; pure metals.

Wheelco Instruments Co., Chicago. **Booth 1909.**
Exhibiting (in operation): Strip chart recorder, controllers, pyrometers, resistance thermometers, portable instruments.

Wilson Mechanical Instrument Co. (American Chain & Cable Co., Inc.), New York City. **Booth 519.**
Exhibiting (in operation): Tukon and Rockwell hardness testers.

Wilson Welder & Metals, Inc., New York City. **Booth 422.** See **Air Reduction Sales Co.**

Worthington Pump and Machinery Corp., Harrison, N. J. **Booth 506.**
Exhibiting (in operation): Welding positioners, turning rolls and all-speed drive units.

Entries Invited in Metallographic Exhibit

The fifth Metallographic Exhibit of the American Society for Metals will be held at the National Metal Congress and Exposition in Chicago, Oct. 23 through 27. A large area in Chicago's International Amphitheatre has been reserved so that micrographs can be displayed to best advantage.

Entries in the A.S.M. Metallographic Exhibit have been invited on the basis of a dozen different classifications. Metallographers will thus have an opportunity to display their best work in the fields of cast iron and steel, toolsteels, alloy steels, light metals, nonferrous metals, stainless steel, and other categories listed on page 4.

A committee of judges, appointed by the Metal Congress management, will award a grand prize, consisting of $100 and an engrossed certificate, to the exhibitor whose work is judged "best in show". The grand prize entry will become the property of the American Society for Metals and will later go on permanent display in the Sauveur Memorial Room at the Society's Cleveland headquarters.

In addition, a blue ribbon will be presented to the best entry in each classification, and honorable mentions to those which, in the opinion of the judges, closely approach the winners in excellence. Complete rules for submission of micrographs are given on page 2.

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VOLUME 6
A.S.M. REVIEW OF METAL LITERATURE

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The yearly editions of the A.S.M. Review of Metal Literature are your reference key to all published information on metals and the metal industry. Volume 6 contains a complete survey of all the metallurgical literature published during the period January through December 1949.

Reprinted from the monthly issues of *Metals Review*, they are collected into standard book size (6 x 9, red cloth binding) and are accompanied by 85 pages of subject index and a complete author index, thus constituting an invaluable research and library tool. Another convenient feature is the list of addresses of publishers of all of the periodicals and pamphlets included in this volume. (Addresses of book publishers are included in the individual abstracts.)

The table of contents lists the 25 subdivisions and classifications of the industry with explanatory notes on each. This classification is arranged primarily by process, and is supplemented by the comprehensive subject index, liberally sprinkled with cross-references, for quickly and easily locating the information you need on any phase of metallurgy and related fields.

The abstracts are better designated as annotations, since they are brief notes indicative of the contents and not a substitute for a reading of the article or book. All of these brief digests were prepared by the expert librarians and abstractors on the staff of Battelle Memorial Institute. The extensive holdings in the Battelle library insure a complete coverage of both domestic and foreign literature.

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THIRTY YEARS AGO

Notes Gleaned From Early Issues of the Proceedings of the Steel Treating Research Society and the Journal of the American Steel Treaters Society, Ancestors of A. S. M.

—30—

A speaker at an early meeting of the Chicago chapter quoted a certain professor's fear that "movies are getting under our hide to the extent that we are not taking any interest in matters of a technical nature". This fear, according to the speaker, was completely refuted by the spirit expressed in the "steel treaters' " meetings he had attended. Present chapter officers, therefore, need have no worries about the competition offered by Georgeous George and Milton Berle.

—30—

In a full-page ad in the Sept. 1920 issue of the *Journal*, the *Iron Age* congratulates the American Steel Treaters Society "on its wonderful growth. That the society has so quickly taken a place among the leading technical bodies of the country demonstrates there was need for such a national organization. Long may it thrive!" The advertisement goes on to call attention to *Iron Age*'s booth at the forthcoming convention and exhibit—first of an unbroken series of space reservations by this publication.

—30—

The healthy start given the present National Metal Congresses (this year in Chicago will be the 32nd) is indicated by the list of over 125 exhibiting firms at the second annual convention and exposition held at Commercial Museum in Philadelphia in 1920.

—30—

Seventy-five papers are listed on the technical program for the convention. Among the authors are three who were destined later to serve as national presidents of the society. They are: A. H. D'ARCAMBAL, then chief metallurgist, Pratt & Whitney Co., now general sales manager for Niles-Bement-Pond Co.; H. J. FRENCH of the National Bureau of Standards, now a vice-president of International Nickel Co.; and OSCAR E. HARDER, associate professor of metallography, University of Minnesota, now assistant director of Battelle Memorial Institute.

—30—

September 1920 marked the final issues of both the *Journal* of the American Steel Treaters Society and the *Proceedings* of the Steel Treating Research Society, and in October was born the *Transactions* of the American Society for Steel Treating, a single organization resulting from the amalgamation of the two original societies.

—30—

Both publications printed valedictory editorials commending the amalgamation action and predicting (with accurate clairvoyance) a rosy future for the new organization. The *Journal* editorial was signed by T. E. BARKER*, president of the American Steel Treaters Society, and editorials in the *Proceedings* appeared over the signatures of L. S. CARRICK, secretary of the Steel Treating Research Society, and C. N. DAWE, chairman of publications (now retired).

* Now deceased.

Frank Bond, Pittsburgh Chain Manufacturer, Dies of Heart Attack

Frank A. Bond, vice-president and secretary of the McKay Co., Pittsburgh chain manufacturers, died of a heart attack on July 3 at his summer home in Erie, Pa. He was 67 years old.

Mr. Bond became associated with the Standard Chain Co. in 1905, and later, during World War I, organized and formed the National Chain Co. of Marietta, Ohio. He joined the McKay Co. in 1919 where he held the position of executive vice-president and secretary.

Mr. Bond was active in many professional organizations, including the American Society for Metals.

Henry A. Curtis

Henry A. Curtis of Rock Island, Ill., died July 22. He had been in ill health for the past year.

Mr. Curtis had been metallurgist at Rock Island Arsenal for the past 13 years and was well known in the steel and foundry industries. He took an active part in armor plate development during the war and was responsible for many improvements in aluminum castings for ordnance applications.

Ralph J. Hoenshied

Ralph J. Hoenshied, founder and president of the Commercial Steel Treating Corp. of Detroit, died in July at the age of 51. Mr. Hoenshied, who started the steel treating firm in 1927, was founder and past president of the Metal Treating Institute and the Detroit Metal Treaters Association, as well as an early member of A.S.M.

Nathan Lester

Nathan Lester, president of the Lester Engineering Co. and of Lester-Phoenix,, Inc., died of a heart attack on June 10 at his home in Cleveland. His death, at the age of 66, brought to an end a lifetime devoted to the die-casting process and later to injection molding.

Mr. Lester's background was that of a tool maker, and it was this training that led him to designing machinery. He held many patents in the die-casting and plastics fields for creative work. The companies which bear his name were organized in 1935 to design and manufacture his machines.

Dalzell Named to A. E. C. Reactor Development Div.

R. Carson Dalzell has been appointed to the staff of the U. S. Atomic Energy Commission's Reactor Development Division. He will be concerned with the development and procurement of special reactor materials which will withstand the intense heat and radiation of nuclear fission.

Dr. Dalzell was formerly chief technical advisor with Revere Copper and Brass, Inc., in Rome, N. Y. He had been with Revere for 13 years in Rome, Detroit, Chicago and Baltimore. He is a 1927 graduate of Johns Hopkins with a degree in electrical engineering, and received his master's degree in nonferrous metallurgy and doctorate of science in metallurgy from the Harvard Graduate School of Engineering in 1928 and 1929.

Dr. Dalzell is a past chairman of the Rome Chapter A.S.M., and has also served as the chapter reporter to *Metals Review*.

Deferment Policy Announced

A deferment policy for reservists and National Guard members, recently announced in Washington, will probably serve as a rough pattern for selective service deferments when and if necessary.

The basic criteria for deferment of reservists are the Department of Labor List of Critical Occupations and the Department of Commerce List of Essential Activities.

Included among the critical occupations on the professional level are metallurgists, both extractive and physical; chemists of various types, engineers ranging from ceramic to mining, and tool and die designers. Among the skilled occupations listed as critical are tool and die makers, machinists, molders, pattern makers, and iron and steel rollers.

The reservist deferred must be engaged in one of these critical occupations necessary to a highly essential activity, and he will be deferred only until he can be replaced. The three military services will administer the new policy.

Resigns for Consulting Work

Henry P. Keshian, a past national trustee of A. S. M., has retired as steel metallurgist for the Chase Brass and Copper Co. after 33 years. He was graduated from Yale University in 1915 and was previously with Winchester Repeating Arms Co. He expects to engage in consulting work in the future.

Western Metal Show To Be in Oakland Week of March 19

The Oakland, Calif., Civic Auditoriums will be the scene of the 1951 Western Metal Congress and Exposition, March 19-23, the seventh to be held in the interests of the western metalworking industries.

Management of the Western Metal Show will again be under the direction of William H. Eisenman, national secretary of the American Society for Metals, sponsors of the event. Co-sponsoring the Congress activities will be approximately 20 cooperating technical societies whose interests apply to the oil, chemical, manufacturing, aviation, mining and other western industries.

Heading the general committee of the 1951 Metal Congress and Exposition is Harry Lewis, chairman of the Golden Gate Chapter A. S. M. Vice-chairman is Bert Depew of General Electric Co. Also on the committee are Philip McCaffery, General Metals Corp., E. A. Daniels, Victor Equipment Co., representing the American Welding Society and Harry E. Krayenbuhl, Oliver United Filters, Inc., general secretary.

Professor Earl R. Parker, University of California, will have charge of the technical program, and W. A. Fletcher, E. F. Houghton & Co., will handle publicity. On the committee for exhibits is G. B. Berlien, Industrial Steel Treating Co., with Paul G. Childs, Earle M. Jorgensen Co., in charge of entertainment, and George A. Nelson, Shell Development, in charge of cooperating societies.

Other committee members include Guy M. Winton, Allegheny Ludlum Steel Co., for attendance; Tom Hutton, Thomas H. Hutton & Son, for information and registration; Charles Blesch, Natural Gas Equipment Co., for housing; and Fred I. Donlevy, Caterpillar Tractor Co., for plant inspection.

The big event in March next will mark the second time that Oakland has played host to the thousands of metallurgists, engineers, production executives and management officials whose activities and talents have built within the eleven western states one of the greatest metals producing and metals fabricating areas in the world. Those who recall the outstanding success of the Oakland meeting in 1947 may well expect an even greater Congress and Exposition in 1951, in view of the continued growth of the industry and the added strategic importance of the area in connection with national security.

Foreign Research Awards Offered Under Fulbright Act

Approximately 300 awards for United States citizens to serve as visiting lecturers or to undertake research abroad during the academic year 1951-52 have been announced by the Department of State under the provisions of the Fulbright Act.

Most of the countries participating in the Fulbright program—especially France, Italy and the United Kingdom—provide a number of awards without designating the subject or receiving institution. University teachers or post-doctoral scholars in the field of engineering and related fields should not hesitate to apply for undesignated awards, especially for research, in countries in which they are interested.

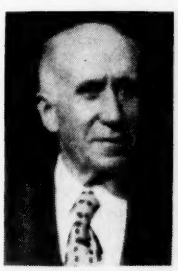
In addition to these undesignated awards, some specific opportunities are also mentioned. For instance, in the United Kingdom, both Birmingham University and Sheffield have expressed an interest in receiving visiting lecturers and research scholars in the field of metallurgy.

The closing date for filing applications for lecturing and research awards for 1951-52 is Oct. 15, 1950. Requests for application forms and further information should be addressed to the Committee on International Exchange of Persons, Conference Board of Associated Research Councils, 2101 Constitution Ave., Washington 25, D. C.

Compliments

To CHARLES SANBORN BARRETT, research professor in the Institute for the Study of Metals, University of Chicago, on the award of the Francis J. Clamer Medal by the Franklin Institute. The medal is awarded for meritorious achievement in the field of metallurgy.

♦ ♦ ♦



C. A. Ellicock

To CHARLES A. ELLICOCK, head of the membership department in the national headquarters of the American Society for Metals, on the completion of 25 years of service with the Society.

♦ ♦ ♦

To PENNSYLVANIA STATE COLLEGE and EDWARD STEIDLE, dean of the School of Mineral Industries, on publication of the handsome book entitled "Mineral Industries Education".

♦ ♦ ♦

To HAROLD S. FALK, president of the Falk Corp., sustaining member of the Milwaukee Chapter A.S.M., on the receipt of the National Metal Trades Association's Industrial Relations Achievement Award.

♦ ♦ ♦

To LES MORRELL, formerly secretary-treasurer of the St. Louis Chapter A.S.M., on his election as secretary-treasurer of the St. Louis Section of the American Society of Mechanical Engineers.

IMPORTANT MEETINGS *for October*

Oct. 2-5—American Gas Association. Annual Meeting and Exhibition of Gas Appliances and Equipment, Convention Hall, Atlantic City, N. J. (Harold Massey, assistant managing director, Gas Appliance Manufacturers Association, 60 East 42nd St., New York City.)

Oct. 4-6—American Hot Dip Galvanizers Association, Inc. Semi-Annual Meeting, Greenbrier Hotel, White Sulphur Springs, West Va. (Stuart J. Swensson, secretary, A.H.D.G.A., 2311 First National Bank Bldg., Pittsburgh 22.)

Oct. 5-6—Texas Chapter, American Foundrymen's Society. First Annual Regional Foundry Conference, Plaza Hotel, San Antonio, Texas. (C. R. McGrail, Texaloy Foundry, 1407 Hoefgen, San Antonio, Texas.)

Oct. 11—American Iron and Steel Institute. Regional Technical Meeting, Hotel William Penn, Pittsburgh. (George S. Rose, secretary, A.I.S.I., 350 Fifth Ave., New York 1.)

Oct. 11-14—Electrochemical Society, Inc. Semi-Annual Meeting, Hotel Statler, Buffalo. (The Society, 235 West 102nd St., New York 25.)

Oct. 12-13—Gray Iron Founders' Society. 22nd Annual Meeting, Netherland Plaza Hotel, Cincinnati, Ohio. (R. L. Collier, executive vice-president, G.I.F.S., 210 National City-East 6th Bldg., Cleveland 14.)

Oct. 16-20—National Safety Council. 38th National Safety Congress and Exposition, Chicago. (R. L. Forney, general secretary, N.S.C., 425 North Michigan Ave., Chicago 11.)

Oct. 18-19—Armour Research Foundation and Graduate School of Illinois Institute of Technology. Sixth Annual National Conference on Industrial Hydraulics, Sherman Hotel, Chicago. (Frank W. Edwards, conference secretary, director of civil engineering, Illinois Institute of Technology, 3300 South Federal St., Chicago 16.)

Oct. 23-27—American Institute of Electrical Engineers. Fall General Meeting, Skirvin Hotel, Oklahoma City, Okla. (A.I.E.E., 29 West 39th St., New York 18.)

Oct. 23-27—National Metal Congress and Exposition, International Amphitheatre, Chicago. See programs of cooperating societies in the first section of this issue of *Metals Review.* (W. H. Eiseman, director, 7301 Euclid Ave., Cleveland 3.)

Oct. 25—American Iron and Steel Institute. Regional Technical Meeting, Hotel Thomas Jefferson, Birmingham, Ala. (George S. Rose, secretary, A.I.S.I., 350 Fifth Ave., New York 1.)

Manual on Speaking Offered

A practical pocket-size manual on "Speaking Can Be Easy—for Engineers" has been prepared by the Committee on Relations With Industry of the American Society for Engineering Education. The text was written by experienced engineering speakers under the editorship of Erhardt C. Koerper, research consultant, A. O. Smith Corp., an A.S.M. member. Information of value to meeting chairmen as well as speakers is included in this booklet.

The manual is available at 50 cents a copy from the Engineers' Council for Professional Development, 29 West 39th St., New York 18.

Radiographic Standard Issued

All persons interested in radiographic testing are invited to submit criticisms and comments on a new Recommended Practice for Radiographic Testing which has been developed by Committee E-7 on Nondestructive Testing of the American Society for Testing Materials.

Copies of the proposed Recommended Practice are available from A.S.T.M. headquarters, 1916 Race St., Philadelphia 3, at 50 cents each. Criticisms should be addressed to the chairman of the Subcommittee on Radiographic Procedures, namely, H. E. Seemann, research laboratory, Eastman Kodak Co., Kodak Park, Rochester 4, N. Y., not later than Oct. 16, 1950.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Oct. 10	University Club	C. K. Donoho	Nodular Graphite Cast Iron
Baltimore	Oct. 16	Engineers Club	R. H. Aborn	Martensite and Martempering
Birmingham	Oct. 3	Hooper's Cafe	H. M. Banta	The Welding of Low-Alloy High-Strength Steels
Boston	Oct. 6	Hotel Sheraton	M. B. Bever	Surface Hardening
Buffalo	Oct. 12	Hotel Sheraton	H. B. Knowlton	Performance of Steel Parts
Calumet	Oct. 10	Phil Smidt & Son, Hammond, Ind.	E. Gammeter	Stainless Steel
Canton-Mass.	Oct. 9	Mergus Restaurant	E. E. Thum	Implications of Atomic Energy
Cedar Rapids	Oct. 10	Roosevelt Hotel		Ferrous Welding
Chicago	Oct. 9	Furniture Club	H. Kincaid	Heat Treatment of Gears
Cleveland	Oct. 2	Ohio Crankshaft Co.		Plant Visitation
Columbus	Oct. 4	Broad St. Church	L. J. Tarasov	Metallurgical Aspects of Grinding
Dayton	Oct. 11	Engineers Club	J. O. Almen	Fatigue
Detroit	Oct. 9	Rackham Memorial Bldg.	E. S. Rowland	Woodside Lecture
Hartford	Oct. 10		C. S. Strike	New England Steel Mill
Indianapolis	Oct. 16		J. C. Fisher	The Plastic Flow of Metals
Lehigh Valley	Oct. 13	Carpenter Steel Co., Reading, Pa.		Plant Visitation
Los Angeles	Oct. 12	Rodger Young Auditorium	S. G. Fletcher	Toolsteels
Mahoning Valley	Oct. 10	Post Room, V.F.W.	L. F. Yntema	The Refractory Metals
Milwaukee	Oct. 17	City Club	N. K. Koebel	Copper Brazing
Montreal	Oct. 2	Queen's Hotel	J. L. Cotsworth	The Manufacture and Use of Stainless Steel Sheet, Strip and Plate
New Haven	Oct. 19	Hotel Elton, Waterbury	J. J. Hoben	New Continuous Brass Mill of the Scovill Manufacturing Co.
New Jersey	Oct. 16	Essex House, Newark	D. W. Talbott	Heat Resistant Alloy Castings
New York	Oct. 5	Latin Quarter		Smoker
North West	Oct. 19	Covered Wagon, Minneapolis	F. G. Sefing	Structure Control Vs. Wear Resistance of Cast Irons
Northwestern Pa.	Oct. 19	Oil City	H. W. McQuaid	Economics in the Metallurgical World
Northern Ontario	Oct. 18	Windsor Hotel, Saulte Ste. Marie	D. V. Hamilton	Ferro-Alloys
Notre Dame	Oct. 11	Engineering Bldg.	Bruce W. Gonser	Titanium
Oak Ridge	Oct. 11	K. of C. Home	W. J. Koshuba	Metal-Ceramic Technology
Ontario	Oct. 6	Toronto	J. O. Almen	Residual Stress and Fatigue
Peoria	Oct. 9	Morton, Ill.	W. H. Holcroft	Carbonitriding
Philadelphia	Oct. 27	Engineers Club	W. R. Meyer	Metallurgical Aspects of Electrodeposited Coatings
Pittsburgh	Oct. 12	Roosevelt Hotel	W. M. Baldwin, Jr.	Fracture of Metals
Saginaw Valley	Oct. 17	Frankenmuth, Mich.	E. H. Dix	New Developments of Aluminum Alloys
St. Louis	Oct. 20	Forest Park Hotel	Frederic O. Hess	High Speed Heating of Steel
Springfield	Oct. 16	Springfield, Vt.		
Terre Haute	Oct. 2	Rose Polytechnic Inst.	E. A. MacLean	Testing Demonstrated
Tri City	Oct. 3	Rock Island Arsenal Cafeteria	R. S. Burns	The Deep Drawing of Steel Sheets
Tulsa	Oct. 9	Carosel Restaurant	E. J. Pavesic	Heat Treatment of Steel
Warren	Oct. 12			Plant Visitation
West Michigan	Oct. 16	Morton Hotel, Grand Rapids	D. T. Sicklesteel	Automatic Transmissions
Worcester	Oct. 11	General Motors Corp., Framingham		Plant Visitation
York	Oct. 11	Waynesboro, Pa.	W. R. McCracken	Nodular Cast Iron

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio
W. W. Howell, Technical Abstractor
Assisted by Pauline Beinbrech, N. W. Baklanoff, Fred Rothfuss, and Leila M. Virtue

A GENERAL METALLURGICAL

211-A. Should U. S. Suspend Copper Import Duty? *Metals*, v. 21, July 1950, p. 6-7, 9-12.

Debate in print. Affirmative is taken by John A. Danaher (Revere Copper and Brass) and Simon D. Strauss (American Smelting & Refining Co.). Negative view is supported by A. D. Parsons (representing 14 domestic copper producers) and A. E. Petermann (Calumet and Hecla Consolidated Copper Co.). (A4, Cu)

212-A. Argentine Steel Plant Nears 100,000-Ton Capacity. A. W. Gregg. *Iron Age*, v. 166, July 20, 1950, p. 101-103.

Rapid development of Argentine's steel producer which has increased its yearly tonnage from 3500 metric tons 7 years ago to a proposed 100,000 tons in 1950. (A4, D general, ST)

213-A. An Appraisal: Today's World Aluminum Industry. Irving Lipkowitz. *Modern Metals*, v. 6, July 1950, p. 16-18.

Surveys the industry with special emphasis on Russia's productive facilities. Estimates of 1950 Russian production vary all the way from 50 to 1000 million lb. (A4, Al)

214-A. Some Technological and Economic Problems of the Steel Industry. R. E. Zimmerman. *Mines Magazine*, v. 40, July 1950, p. 8, 43-44, 46.

Iron-ore supply situation, industrial waste problems, sulfur in coking coal, the pension problem, government regulation, etc. (A4, B10, Fe)

215-A. Along P & W's Jet Production Line. *Aviation Week*, v. 53, July 24, 1950, p. 22, 24-25.

Miscellaneous finishing, joining, machining, assembly, and inspection procedures. (A5, T24)

216-A. Acid Salvaging Process Cuts Pickling Costs. F. J. Bartholomew. *Steel*, v. 127, July 31, 1950, p. 68, 70, 72.

New process includes concentration of free acid, separation of crystallized ferrous sulfate by filtration, and converting the sulfate to fresh sulfuric acid. Equipment and procedures for the last step. The sulfate is formed into pellets and roasted with coal or pyrite in a Dwight-Lloyd sintering machine, forming SO_2 and Fe_2O_3. The former is used to make H_2SO_4 and the latter returns to the steel-making furnace. (A8, L12, ST)

217-A. Modern Fabricating and Finishing Equipment Speeds Specialized Production. Lee Beckman. *Finish*, v, 7, Aug. 1950, p. 19-25, 50-51.

The effective use of modern fabricating, welding, and finishing equipment, plus simplified storage and handling methods, in the quantity production of home-heating registers. (A5, G1, K3, L26, CN)

218-A. Automobile Engineering Research. *Engineering*, v. 170, July 7, 1950, p. 8-9.

Describes and illustrates work of Motor Industries Research Assn. in England, which includes lubricants, fuels, materials of construction, and design. Fatigue strength, service failures, abrasive wear, corrosion, and stresses of various assemblies are being studied. (A9, T21)

219-A. High Temperature Steel for Jet Engines: Research and Development Programme of William Jessop and Sons, Limited. *British Steelmaker*, v. 16, July 1950, p. 352-354. (A9, T25, SG-h, AY)

220-A. Practical Methods for Treatment of Plating Room Wastes. *Products Finishing*, v. 14, Aug. 1950, p. 68, 70, 72, 74, 76, 78, 80, 82, 84.

Surveys papers presented at 5th Industrial Waste Conference held recently at Purdue University. (A8, L17)

221-A. Steel Behind the Iron Curtain. Demitri B. Shimkin. *Iron Age*, v. 166, Aug. 3, 1950, p. 67-72; Aug. 10, 1950, p. 65-69.

Facilities, ore resources, technology, and recent production. Includes data on other metallic ores besides iron. Second part emphasizes Far Eastern resources (Manchuria and North Korea). (A4, B10, Fe)

222-A. Aluminum Project in B. C. R. V. Steel. *Canadian Metals*, v. 13, July 1950, p. 8-10, 50.

Reviews long-term project of Aluminum Co. of Canada which is still in the survey stages. (A4, A5, Al)

223-A. Conservation of Resources; a Metallurgist's View of the United Nations Scientific Conference. H. Sutton. *Metal Industry*, v. 77, July 7, 1950, p. 3-5; July 14, 1950, p. 19-22; July 21, 1950, p. 35-38; July 28, 1950, p. 57-58.

In the July 7 issue, a few papers of wide interest are discussed: "The World Resources Situation", Fairfield Osborn; "World Resources and World Population", Colin Clark; "Critical Mineral Shortages", H. L. Keenleyside; "Conservation of Mineral Resources", Donald H. McLaughlin; and two papers on "Metals in Relation to Living Standards", D. H. Wadia and Howard Meyerhoff. In the July 14 issue, papers of more specific metallurgical interest are reviewed. They include several on techniques, possibilities, costs, and other features of mineral discovery; one on conservation of metals in use; one on electrolytic tinplate; and one on conservation of lead. The July 21 issue reviews several papers on corrosion, its costs and prevention by coatings, and other methods. The concluding installment deals with uses and advantages of Ti, Al, and Mg (3 papers); and with mineral resources of the Dead Sea. (A4, B10, L17, R general)

224-A. Aluminium Explosion Hazards; Violent Reactions with Chlorinated Hydrocarbons. *Chemical Age*, v. 63, July 29, 1950, p. 155-157.

Test results made by Underwriters' Laboratories, Chicago. Powdered Al or Mg reacted violently with a variety of chlorinated hydrocarbons at ordinary or moderately elevated temperatures. (A7, Mg, Al)

225-A. Problems in the Use of Molten Chemical Salts for the Separation of High and Low-Melting Metals. (In German.) Edmund R. Thews and Martin Stromeyer. *Chemische Technik*, v. 2, May 1950, p. 157-161.

The older methods of separating metals and results obtained on scrap nonferrous metals with borax-boric acid and with NaCl-NaOH mixtures. Advantages and disadvantages of the proposed method. (A8, C28, EG-a)

226-A. Metallurgy in Spain. F. R. Morral. *Metal Progress*, v. 58, Aug. 1950, p. 197-198.

Present status. (A4)

227-A. Smelting Mixed Flue Dust. C. W. Jensen. *Mining Magazine*, v. 82, Apr. 1950, p. 211-214.

Continental practice and equipment for material containing Sn, Pb, and Zn. (A8, C21, Pb, Sn, Zn)

228-A. Value of Domestic Production of Minerals From Various Classes of Rock. V. E. McKelvey, J. E. Crawford, D. F. Davidson, and R. L. Boardman. *Economic Geology and the Bulletin of the Society of Economic Geologists*, v. 45, Aug. 1950, p. 470-479.

Fluids and sedimentary rocks accounted for 48 and 36%, respectively, of the total value of 1946 domestic mineral production. Epigenetic (vein and replacement) and metamorphic deposits each contributed 6% of the total, and residual and igneous deposits accounted for 3 and 1%, respectively. Fuels were 77% of the total. (A4)

229-A. (Book) Newnes Engineer's Reference Book. Ed. 3. F. J. Camm, editor. 1608 pages. 1950. George Newnes, Ltd., Tower House, Southampton St., London W.C. 2, England. 45s.

Over 70 sections including such subjects as thermodynamics, hydraulics, workshop mathematics, the various workshop processes, machine design, and metallurgy. Numerous useful tables and formulas

are included. Over 300 pages have been added to this edition. (A general)

230-A. (Book) **British Non-Ferrous Metals Directory 1949.** Ed. 2. 261 pages. Metal Information Bureau, Ltd., 27 Albemarle St., London, W. 1., England. 10s.

A guide to British producers and suppliers of raw and semi-finished nonferrous metals. Considerable improvements have been made in the size and general production of the book compared with the first edition, issued in 1947. (A4, EG-a)

231-A. (Book) **Minerais et Métaux Statistiques** (Ore and Metal Statistics), 1948. 158 pages. 1949. Minerais et Métaux Société Anonyne, Paris.

Includes data for Cu, Pb, Zn, Sn, Sb, Cd, Co, Ni, Al, Mg, S, and Au. (A4)

B

RAW MATERIALS AND ORE PREPARATION

229-B. Sink-Float at the Sullivan Concentrator. H. R. Banks. *Mining Congress Journal,* v. 36, July 1950, p. 28-31.

Equipment and procedures of Pb-Zn concentrator of Consolidated Mining & Smelter Co. of Canada. Includes flow diagram. (B14, Pb, Zn)

230-B. Studies of Recovery Processes for Western Uranium Bearing Ores. Part VII. Wet Concentration. David J. Crouse. *U. S. Atomic Energy Commission,* AECD-2849, Dec. 6, 1949, 33 pages.

Scrubbing by stirring and by ball milling with and without grinding media; effect of surface-active agents; and further processing of slimes and sands from a concentrating process. (B13, B14, U)

231-B. Sources of Britain's Platinum; Rich Yields From South Africa's Deposits. *Chemical Age,* v. 63, July 1, 1950, p. 21-22. (B10, Pt)

232-B. Metal-Monolayer Interactions in Aqueous Systems. Part I. The Interaction of Monolayers of Long-Chain Polar Compounds With Metal Ions in the Underlying Solution. Part II. The Adsorption of Long-Chain Compounds From Aqueous Solution onto Evaporated Metal Films. G. A. Wolstenholme and J. H. Schulman. *Transactions of the Faraday Society,* v. 46, June 1950, p. 475-497.

In Part 1, effects on mechanical properties of myristic acid monolayers, produced by the presence of salts of Fe, Al, Cu, Co, Mn, Ca, and Mg in the underlying solution were investigated. In part II, evaporated films of Cu and Ag on hydrophilic surfaces were immersed in aqueous solutions of surface-active long-chain compounds, and contact angles with these solutions measured under controlled conditions. 34 ref. (B14, P10, P13)

233-B. Utilizing Dolomite for Heroult Electric-Furnace Linings. (In Japanese.) **Fujio Takahashi and Kazuhiko Yamanouchi.** *Journal of the Casting Institute of Japan,* v. 21, no. 1, 1949, p. 10-13.

Use of raw dolomite instead of magnesia clinker. (B19, D5)

234-B. Experimental Use of "Chamotte" Refractories in the Roofs of Heroult Electric Furnaces. (In Japanese.) T. Kinoshita and H. Koga. *Journal of the Casting Institute of Japan,* v. 21, No. 3, 1949, p. 2-4.

Investigated because of wartime shortages. Use was found feasible in spite of disadvantages. Some silica blocks are still used in strategic locations. (B19, D5)

235-B. Cyclone Proves Satisfactory for Thickening, Desliming Flotation Feed. Robert L. Kingman. *Mining Engineering,* v. 187, Aug. 1950, p. 867-870.

Experimental work on the Dutch State Mines Cyclone for thickening and desliming flotation feed at the concentrator of the National Lead Co., Tahawus, N. Y. (B14)

236-B. A New Theory of Comminution. Fred C. Bond and Jen-Tung Wang. *Mining Engineering,* v. 187, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 187, 1950, p. 871-878.

An empirical equation is presented which covers the entire comminution range. The new strain-energy theory considers comminution from the known principles of mechanics and the reduction ratio. Energy requirements according to the different theories are compared. 18 ref. (B13)

237-B. An Improved Method of Gravity Concentration in the Fine-Size Range. Arvid Thunaes and H. Rush Spedden. *Mining Engineering,* v. 187, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 187, 1950, p. 879-882.

Pilot-plant test work in 1942 and 1943 showed that by a combination of desliming, fine-size classification, and Sullivan deck concentration it is possible to recover heavy minerals such as cassiterite at least as fine as 10 microns in size. This appreciable improvement in gravity concentration practice has been substantiated by several full-sized plants. Data are for Bolivian tin ores. (B14, Sn)

238-B. High Grade Iron Ore From Low Grade Deposits. R. W. Hedges. *Iron Age,* v. 166, Aug. 3, 1950, p. 79-84.

Heavy-media separation process being more and more extensively used in the Lake Superior region. Costs and economic significance. 12 ref. (B14, A4, Fe)

239-B. Cerro Bolivar—U. S. Steel's New Iron Ore Bonanza. Mack C. Lake. *Engineering and Mining Journal,* v. 151, Aug. 1950, p. 72-83.

Discovery, geology, probable origin, and plans for exploitation of above iron-ore discovery in Venezuela. 11 ref. (B10, Fe)

240-B. The Humphreys Spiral—Some Present and Potential Applications. James V. Thompson and Whitman E. Brown. *Engineering and Mining Journal,* v. 151, Aug. 1950, p. 87-89.

The place in mineral dressing won by the spiral; suggests new flowsheets where it might well be used. (B14)

241-B. Ferromanganese From Anaconda. *Mining World,* v. 12, Aug. 1950, p. 15-17.

How rhodochrosite from Anaconda's mines near Butte, Mont., is concentrated by soap flotation, calcined, nodulized, and smelted to ferromanganese. (B14, B15, B16, C21, Fe-n, Mn)

242-B. Cleveland-Cliffs Iron Company Uses Separator on Trumbull Ore. *Mining World,* v. 12, Aug. 1950, p. 37, 39.

The first commercial application of a Hardinge heavy media separater to low-grade iron ore at the Hill Trumbull operation of the Cleveland-Cliffs Iron Co., near Taconite, Minn. (B14, Fe)

243-B. Recent Progress in Refractories. III. Dolomite. IV. Chrome and Chrome-Magnesite. J. H. Chesters. *Ceramic Age,* v. 56, July 1950, p. 22, 25-27.

Particularly as used in steelmaking furnaces. 10 ref. (B19, D general)

244-B. Studies of Recovery Processes for Western Uranium Bearing Ores. Part V. Tests of Specific Leaching of Carnotite Ores. C. F. Coleman. *U. S. Atomic Energy Commission,* AECD-2846, Oct. 31, 1949, 14 pages.

Briefly describes tests and results. (B14, U)

245-B. Ore Dressing Problems of the Sontra Copper Schists. (In German.) Johann Petri. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 3, Jan. 1950, p. 6-14.

Methods developed for beneficiating this ore. Several mechanical processes and flotation methods were tried without success. Only an electrostatic method gave satisfactory results. Details of the latter, including pilot-plant flow sheet. (B14, Cu)

246-B. Comparative Consideration of Zinc Production Methods Now in Use. (In German.) Walther Hänig. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 3, Jan. 1950, p. 22-26; Feb. 1950, p. 55-58.

Various methods of extracting Zn from its ores. (B general, C general, Zn)

247-B. Measuring Technique in the Blende Roasting Plant. (In German.) Willi Gehrhardt. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 3, June 1950, p. 182-190.

Instrumentation for measurement and control in the roasting of ores. Includes diagrams, chart records, and tables of typical data. (B15)

248-B. Possible Annual Production of Steep Rock Iron Ore Seen as 10 Million Tons. Dan Reebel. *Steel,* v. 127, Aug. 21, 1950, p. 88-93, 110.

Detailed survey, including maps and illustrations, of iron-ore resources of Ontario deposit. Diversion of river and pumping-out of lake was necessary before recovery of the ore could be begun on a large scale. (B10, Fe)

249-B. Gold Recovery in Some Ontario Mills. E. J. Pryor. *Mining Magazine,* v. 82, Mar. 1950, p. 137-143.

Practice at several gold mines in the Kirkland Lake and Timmins districts. Includes flow diagrams. (B14, Au)

250-B. Progress in Size Reduction. Graham Oldham. *Mining Magazine,* v. 82, May 1950, p. 279-280.

Reviews recent literature. 21 ref. (B13)

251-B. (Book) **Economic Mineral Deposits.** Ed. 2. Alan M. Bateman. 916 pages. 1950. John Wiley & Sons, 440 Fourth Ave., New York 16. $7.50.

A textbook for both elementary and advanced courses. Principles and processes of formation of mineral deposits. Metallic and nonmetallic occurrences and their use. (B10)

C

NONFERROUS EXTRACTION AND REFINING

84-C. New Process Produces Ductile Chromium Sheet. *Steel,* v. 127, July 24, 1950, p. 61-62.

New processes developed by U. S. Bureau of Mines' Northwest Development Laboratory, Albany, Ore.

Upon heating to above 500° C., the sheet can be bent and cut as easily as mild steel. Metal may be made by electrolytic reduction of a hexavalent salt or by reduction of the chloride with Mg. The spongy product is treated with HNO_3 to eliminate MgO, deoxidized with Zr hydride, ground to −65 mesh, pressed, sintered, and hot pressed in an iron sheath. (See item 85-C, below.)
(C23, H14, Cr)

85-C. Ductile Chromium. W. J. Kroll, W. F. Hergert, and L. A. Yerkes. **Journal of the Electrochemical Society,** v. 97, Aug. 1950, p. 258-264.

Effect of oxide content on malleability. Low-oxide Cr was made by reduction with Mg of chromium chloride in a carrier salt under helium, and separation of the $MgCl_2$ and excess Mg by evaporation in a vacuum at elevated temperature. The metal powder obtained, as well as powdered electrolytic Cr, can be deoxidized with dry hydrogen at 1000° C. A special hydride furnace is used to generate and circulate high-purity hydrogen. The deoxidized chromium is sintered and the sheathed ingots can be hot rolled after hot compressing. The Cr sheet is malleable above 500° C., but is brittle when cold. 27 ref. (C23, H14, Cr)

86-C. Alcoa's New Plant at Point Comfort, Texas. *Metal Progress,* v. 58, July 1950, p. 56-59.

Equipment and procedures for electrolytic reduction of aluminum. (C23, Al)

87-C. Rate of Evaporation of Zinc at Low Pressures. H. W. St. Clair and M. J. Spendlove. *U. S. Bureau of Mines,* Report of Investigations 4710, June 1950, 13 pages.

The effect of temperature, pressure, stirring, and of cross section and length of vapor path on rate of evaporation. (C22, P12, Zn)

88-C. Spectrographic Control in the Refining of Metals. D. M. Smith. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals —A Symposium, 1950, p. 35-44; discussion, p. 45-50.

Previously abstracted from Preprint No. 1, July 1949. See item 2C-48, 1949. (C general, S11)

89-C. Problems in the Production of Some of the Rarer Metals. Alan R. Powell. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 51-66; discussion, p. 66-72.

Previously abstracted from Preprint No. 4, July 1949. See item 2C-51, 1949. (C23, C21, C26, EG-b)

90-C. The Refining of Gold and Silver. A. E. Richards. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium," 1950, p. 73-118; discussion, p. 130-143.

Previously abstracted from Preprint No. 2, July 1949. See item 2C-49, 1949. (C general, Ag, Au)

91-C. The Precious Metals. H. Gordon Dale. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 119-130; discussion, p. 130-143.

Previously abstracted from Preprint No. 5, July 1949. See item 15-58, 1949.
(C general, A8, Ag, Au, EG-c)

92-C. The Fire Refining of Copper. H. J. Miller. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 145-184; discussion, p. 227-244.

Previously abstracted from Preprint No. 6, July 1949. See item 2C-52, 1949. (C21, Cu)

93-C. The Electrolytic Copper Refinery of the Rhodesia Copper Refineries, Ltd., at Nkana, Northern Rhodesia. W. J. Friggens, Eric W. Page, and Thomas Milligan. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium," 1950, p. 203-227; discussion, p. 227-244.

Refinery has a capacity of approximately 60,000 long tons per annum. Proposed future extensions.
(C23, Cu)

94-C. The Refining of Bismuth. Alan R. Powell. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 245-253; discussion, p. 253-257.

Previously abstracted from Preprint No. 3, July 1949. See item 2C-50, 1949. (C general, Bi)

95-C. Cobalt Refining at Rainham Works of Murex, Ltd. P. S. Bryant. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 259-273; discussion, p. 273-279.

Previously abstracted from Preprint No. 17, July 1949. See item 2C-57, 1949. (C general, Co)

96-C. The Refining of Lead and Associated Metals at Port Pirie, South Australia. Frank A. Green. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 281-316; discussion, p. 316-325.

Previously abstracted from Preprint No. 9, July 1949. See item 2C-53, 1949. (C21, B15, Pb)

97-C. Refining of Zinc. Stanley Robson. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 327-342; discussion, p. 342-346.

Previously abstracted from Preprint No. 10, July 1949. See item 2C-54, 1949. (C21, C22, Zn)

98-C. Refining of Tin. E. H. Jones. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals —A Symposium", 1950, p. 347-363; discussion, p. 363-366.

Flotation, acid leaching, smelting, liquation, electrolysis, distillation, and specialized processes.
(C general, Sn)

99-C. Tungsten: Its Preparation for Use in Electronics and Carbide Products. T. F. Smeaton. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 367-386; discussion, p. 387-390.

Previously abstracted from Preprint No. 18, July 1949. See item 2C-58, 1949. (C general, W)

100-C. The Production of Ductile Zirconium. G. L. Miller. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 391-402; discussion, p. 402-405.

Previously abstracted from Preprint No. 19, July 1949. See item 2C-59, 1949. (C general, Zr)

101-C. The Refining of Magnesium. E. F. Emley. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 407-437; discussion, p. 437-443.

Previously abstracted from Preprint No. 12, July 1949. See item 2D-21, 1949. (C general, Mg)

102-C. Refining of Aluminium. J. Waddington. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 445-460.

Previously abstracted from Preprint No. 13, July 1949. See item 2D-22, 1949. (C general, Al)

103-C. Catalytic Distillation of Aluminium. P. Gross. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 461-470; discussion, p. 470-475.

Previously abstracted from Preprint No. 14, July 1949. See item 2D-23, 1949. (C22, Al)

104-C. The Aluminothermic Process and the Preparation of Commercially Pure Chromium, Manganese, and Special Alloys Such as Ferro Columbium. T. Burchell. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 477-496; discussion, p. 496-504.

Previously abstracted from Preprint No. 14, July 1949. See item 2C-55, 1949.
(C26, Cr, Mn, Cb, Fe-n)

105-C. Low-Carbon Ferro Chrome (0.03% C-0.15% C). J. A. Blake. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 505-513; discussion, p. 513-515.

Previously abstracted from Preprint No. 16, July 1949. See item 2C-56, 1949. (C21, Cr, Fe-n)

106-C. Viscosity of Fused Cryolite Baths for Electrolysis of Aluminum. (In Italian.) A. Vayna. *Aluminio,* v. 19, No. 2, 1950, p. 133-145.

Methods for measuring the viscosity of cryolite baths, indicating their physical principles. Diagrams indicate the dependence of viscosity of binary and ternary mixtures on temperature, and the comparative viscosity of typical baths. Method of application of the diagrams to industrial production of aluminum. (C23, P10, Al)

107-C. Investigations on Calcined Pyrites Containing Zinc. Part I. Reducibility of Ferric Oxide and Zinc Oxide in Calcined Pyrites. (In Polish.) M. Smialowski. *Prace Badawcze Glownego Instytutu Metalurgii i Odlewnictwa,* v. 1, No. 2 1949, p. 105-109.

Reducibility of pure Fe_2O_3, ZnO, Zn ferrite, and calcined pyrites containing 49.74% Fe and 9.65% Zn was investigated using H_2, coke-oven gas or coke as reducing agents. Results show that the reducibility of Fe_2O_3 in pure form and combined with ZnO is rather small. On the contrary, the reducibility of ZnO combined with Fe_2O_3 is much lower than that of pure ZnO. 14 ref. (C21, C22, Fe, Zn)

108-C. Electric Heating in Production of Ferrosilicon Alloys. (In Russian.) Ya. S. Shchedrovitskii. *Elektrichestvo* (Electricity), Mar. 1950, p. 70-71.

The contradictory views of several experts concerning processes taking place in furnaces for production of ferrosilicon were investigated. Basic assumptions of Sisoyan are clarified on the basis of experimental data, and it is shown that furnaces do not always operate most efficiently at the highest voltages. (C21, Fe)

109-C. Ferrochromium From Low Grade Chromite Ores and Concentrates. F. W. Wessel and R. T. C. Rasmussen. *Journal of Metals,* v. 188, Aug. 1950, p. 984-988.

Experimental work on a Montana chromite concentrate produced by a Defense Plant Corp. mill using two available reductants (an Oregon sub-bituminous coal and a char made from this coal.) Crucible tests were followed by batch tests in a 500-lb. arc furnace. Finally, one continuous, open-top smelting test was made in a Type ST, 2000-lb. Lectromelt furnace. Results indicate feasibility of the process. 11 ref. (C21, Fe-n, Cr)

110-C. The Electrical Resistivity of Titanium Slags. James L. Wyatt. *Journal of Metals,* v. 188, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 989-994.

Specific electrical resistivities of Ti-containing slags, with iron oxide contents of 2-30%. Values of resistivity as a function of iron oxide content indicate that Ti slags are in general very low in specific electrical resistivity as compared with siliceous slags. Results obtained in

connection with a study of the electric-furnace smelting of ilmenite ores to produce a slag rich in Ti, with pig iron as a byproduct. 12 ref. (C21, D5, B21, Ti, Fe)

111-C. Mechanical Converter Tuyere Punching at the McGill Smelter. John B. Hutti. *Engineering and Mining Journal*, v. 151, Aug. 1950, p. 84-86.

Equipment for mechanical punching of copper converter tuyeres. The machinery has eliminated a difficult, disagreeable, and hazardous job, has increased production rate about 20%, and has reduced refractory consumption. (C21, Cu)

112-C. "Hardeners" for Copper-Base Alloys. E. Voce. *Murex Limited Review*, v. 1, no. 6, 1950, p. 101-105.

The various binary and more complex alloys which are introduced into the molten metal in order to deoxidize it and to modify its properties. (C21, Cu)

113-C. Melting and Casting of Non-Ferrous Metals. G. L. Bailey and W. A. Baker. *Institute of Metals*, "Symposium on Metallurgical Aspects of Non-Ferrous Metal Melting and Casting of Ingots for Working", 1950, p. 7-32.

Previously abstracted from *Journal of the Institute of Metals*, item 14C-13, 1949. (C5, E25, C21, N12)

114-C. Melting and Casting Aluminium Bronze Ingots for Subsequent Working. A. J. Murphy and G. T. Callis. *Institute of Metals*, "Symposium on Metallurgical Aspects of Non-Ferrous Metal Melting and Casting of Ingots for Working", 1950, p. 47-60.

Previously abstracted from *Journal of the Institute of Metals*, item 14C-15. 1949. (C5, Cu)

115-C. The Melting and Casting of Brass. Maurice Cook and N. F. Fletcher. *Institute of Metals*, "Symposium on Metallurgical Aspects of Non-Ferrous Metal Melting and Casting of Ingots for Working", 1950, p. 75-94.

Previously abstracted from *Journal of the Institute of Metals*, item 14C-17, 1949. (C5, Cu)

116-C. The Melting and Casting of Nickel Silver at the Works of Messrs. Henry Wiggin and Co., Ltd. E. J. Bradbury and P. G. Turner. *Institute of Metals*, "Symposium on Metallurgical Aspects of Non-Ferrous Metal Melting and Casting of Ingots for Working", 1950, p. 95-112.

Previously abstracted from *Journal of the Institute of Metals*, item 14C-18, 1949. (C5, Cu)

117-C. The Distribution of Several Metals Between Matte and Speiss (Sulfide and Arsenide Phase) in the Melt. (In German.) Friedrich Leutwein. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 3, Jan. 1950, p. 1-6.

Upon melting of cuprous sulfide and nickel arsenide, as examples of metallurgical mattes and speisses, two phases which are immiscible in the molten state are obtained. The distribution of different metals, added in small amounts to this system, between the two phases was investigated. Eighteen metallic elements are arranged in order of decreasing tendency to enter the sulfide phase. Significance of results for theoretical metallurgy. (C21)

118-C. Separation of Iron From Arsenic-Containing Cobalt Speisses. (In German.) Friedrich Johannsen and Werner Schwartz. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 3, May 1950, p. 138-144.

Experiments show that the removal of Fe from Co speisses through the molten slag follows very closely the law of mass action. Arsenic has practically no effect on the equilibrium, but permits melting at lower temperatures. Sulfur interferes with slagging of the Fe. 13 ref. (C21, Co)

119-C. "Modification" Treatment of Aluminum-Silicon Alloys. (In Portuguese.) Clovis Bradaschia. *Boletin da Associacao Brasileira de Metais*, v. 6, Jan. 1950, p. 26-46.

Use of metallic sodium and various salts containing Na or K for refining Al-Si alloys by addition to the molten metal. Effects of the treatment on chemical and physical properties and microstructure. 12 ref. (C21, Al)

120-C. Treatment of Tin Smelter By-Products. C. W. Jensen. *Mining Magazine*, v. 82, Feb. 1950, p. 73-75.

Treatment in a small continental converter plant is described with details regarding the handling of hard tin high in Fe and As, and of Sn-Pb-Sb-Cu alloys high in Cu. (C21, Sn)

121-C. Lead Smelting at Przibram. C. W. Jensen. *Mining Magazine*, v. 83, July 1950, p. 9-11.

Practice at a Czechoslovakian center. Includes flow diagram. Silver and gold are also recovered. (C21, Pb, Ag, Au)

D

FERROUS REDUCTION AND REFINING

213-D. West's Largest Electric Furnace Increases Steel Making Capacity at Bethlehem Pacific. *Western Metals*, v. 8, July 1950, p. 19. (D5, ST)

214-D. The Advance of Titanium; Increasing Use in Modern Metallurgical Processes. A. E. Williams. *Chemical Age*, v. 63, July 1, 1950, p. 23-25.

Ferrous grain-refining uses; also methods of production. (D general, C general, Fe, Ti)

215-D. Basic Steelmaking; A Survey of the Physical Chemistry of Sulphur. (Concluded.) C. E. A. Shanahan. *Iron and Steel*, v. 23, July 1950, p. 313-316.

Reviews literature on sulfur distribution between slag and molten metal and on equilibria of the reactions involved. 29 ref. (D2, ST)

216-D. Oxygen Lancing; A New Arc Furnace Technique. *Iron and Steel*, v. 23, July 1950, p. 317-319.

Pioneer work on the application of oxygen to 100% 18-8 stainless-steel scrap charges in arc furnaces by Edgar Allen & Co., Ltd. (D5, SS)

217-D. Oxygen Lancing in Electric Arc Furnaces. *British Steelmaker*, v. 16, July 1950, p. 350-352.

Use of complete stainless-steel scrap charge in new technique. (D5, SS)

218-D. Pressure and Flow Distribution in a Model of a Venturi-Type Open-Hearth Furnace. J. A. Leys and E. T. Leigh. *Journal of the Iron and Steel Institute*, v. 165, July 1950, p. 301-306.

Measurements were made on a 1/24 scale model of a 120-ton open-hearth Venturi furnace, of pressure losses in the regenerator and uptake systems, velocity distribution in the air uptakes and in the furnace chamber, and partition of waste gases at the outgoing end of the furnace. Calculations were made of losses between various points in the furnace, and these compared with experimental results. Agreement is generally good. 14 ref. (D2, ST)

219-D. Ingot Heat Conservation; Mould and Ingot Surface Temperature Measurements. A. V. Brancker. *Journal of the Iron and Steel Institute*, v. 165, July 1950, p. 307-313.

Surface temperatures were measured at 36 positions on the four sides of a steel ingot mold. These measurements extended from teeming to stripping. Two complete sets of temperature data were obtained for two different mold positions in a casting pit during two separate top-teeming operations. Significant differences were found between temperatures on the faces of each mold and also between the two mold positions. (D9, S16, ST)

220-D. Flow and Velocities of Air and Waste Gases in Open Hearth Furnaces. H. V. Flagg. *Journal of Metals*, v. 188, Aug. 1950, p. 976-979.

Qualitative effects of design factors on the above and on optimum combustion conditions. Discussion is facilitated by designation of 14 critical areas in the furnace system. (D2, ST)

221-D. Oxygen for Carbon Reduction and Temperature Pickup. E. H. Reyer. *Journal of Metals*, v. 188, Aug. 1950, p. 982-983.

Experiences at Keystone Steel & Wire Co., Peoria, Ill. Use is standard practice during periods when extra production is needed. (D2, B22, ST)

222-D. Plant Development and Progress in the Iron and Steel Industry. A. G. Robiette and G. L. Thomas. *Metallurgia*, v. 42, July 1950, p. 67-90.

Miscellaneous auxiliary equipment. Coke ovens, blast furnaces and ore preparation, steelmaking furnaces, soaking pits and reheating furnaces, and rolling mills and presses. (D general, B14, F23, ST)

223-D. Slag Control in the Basic Electric-Arc Furnace During Production of Cast Steel, and Its Effect on Economy of Production. (In German.) Werner Trommer. *Neue Giesserei*, v. 37 (new ser., v. 3), June 29, 1950, p. 249-255.

A process for melting high-Cr scrap which permits recovery of a high percentage of the Cr, yet limits the P content of the steel. 21 ref. (D5, CI)

224-D. Discussion of "Evaluation of the Bessemer Process in the Small Converter". (In German.) Adolf Lincke. *Neue Giesserei*, v. 37 (new ser., v. 3), June 29, 1950, p. 256-257.

Discussion of recent paper by E. Lanzendörfer (item 141-D, 1950) is supplemented by a tabulated comparison of charges (pig iron and steel scrap: their compositions and physical properties) from cupola furnaces with acid and basic linings. (D3, ST)

225-D. Experiment on Use of High-Frequency Tube Generators. (In Russian.) N. A. Gutsula. *Promyshlennaya Energetika* (Industrial Power), v. 7, May 1950, p. 6-7.

Method of preparing ceramic condensers for sustaining voltages of up to 30 kv. during use of high-frequency tube generators for melting and heat treating steel. In this method, the rough hygroscopic surface of the condenser is covered with two coats of shellac, forming an insulating layer. (D general, J general, ST)

226-D. British Experience With All-Basic Openhearth Furnaces. S. Feigenbaum. *Metal Progress*, v. 58, Aug. 1950, p. 218. Condensed from *Engineer*, v. 189, Feb. 10, 1950.

See item 57-D, 1950. (D2)

E

FOUNDRY

328-E. Modern Core Ovens. Charles H. Barnett. *Industrial Heating,* v. 17, July 1950, p. 1231-1236.

Importance of the core department in the economical operation of a modern foundry. Emphasis is placed on control of certain variables to permit more economical foundry operation. (E21)

329-E. An Experimental Foundry. *Bakelite Review,* v. 22, July 1950, p. 10-11.

Croning process using Bakelite phenolic resins as core binders. (E21)

330-E. Critical Factors To Watch in Investment Casting. R. L. Wood and D. Von Ludwig. *Iron Age,* v. 166, July 6, 1950, p. 88-93; July 20, 1950, p. 92-96.

Recommendations concerning die materials, tolerances, and procedures. Part 2: Melting and preparation of alloys, casting processes, removal of castings from the investment, cleaning, straightening, finishing, and inspection. (E15)

331-E. Applied Hydraulic Theory Improves Casting Technique. James A. Clark. *Iron Age,* v. 166, July 20, 1950, p. 90-91.

How control of metal pouring to conform to solidification rate has improved centrifugal casting output at Watertown Arsenal. The same process can also be applied to ingots and sand castings. For proper use, a knowledge of the basic hydraulic principles involved is outlined. (E23)

332-E. Castings Improved by the Use of Graphite Molding Material. Vladimir A. Grodsky. *Metal Progress,* v. 58, July 1950, p. 60-62.

A mixture which has the properties of a good ordinary molding sand and much higher heat conductivity. Cost is low, especially when old broken crucibles are the source of graphite. Used as a facing for sand molds, this mixture increases mechanical properties of cast metal. (E19)

333-E. World's Largest Induction Furnace for Aluminum Melting in Operation at Vanadium Corp. Plant. Manuel Tama. *Industrial Heating,* v. 17, July 1950, p. 1150-1152, 1154, 1156, 1272.

Includes description of electromagnetic pump for molten metal. (E10, Al)

334-E. Mineral Perlite—Foundry Uses. E. D. Boyle. *American Foundryman,* v. 18, July 1950, p. 25-26.

Recent investigations at the Puget Sound Naval Shipyard in the use of sand additives for improving insulating properties of molding sands and cores indicate that perlite can be used to reduce speed of solidification of molten metal and to eliminate expansion-type casting defects. (E18)

335-E. Modern Foundry Methods: Naval Research Project Develops Unusual Foundry Techniques. *American Foundryman,* v. 18, July 1950, p. 34-38.

Research for U. S. Navy by Alloy Engineering & Casting Co., Champaign, Ill., has resulted in development of radically different methods for producing castings, new mold atmospheres and melt degassing, ceramic-faced sand cores; ceramic and ceramic-graphite molds; continuous temperature and solidification control in the mold through induction heating and brine cooling; and a dielectric heater with variable voltage output automatically adjusted to varying loss factors. Two of the casting processes and some of their related operations. (E general)

336-E. A.F.S. Foundry Glossary: Defines Useful Foundry Terms. *American Foundryman,* v. 18, July 1950, p. 40-41, 92-94.

First installment covers abrasion to bridging. (E general, A10)

337-E. Burning-In the Cupola Bed. B. P. Mulcahy. *American Foundryman,* v. 18, July 1950, p. 42-45.

See abstract of "The Cupola—Its Raw Materials and Operation", *Foundry,* item 89-E, 1950. (E10, CI)

338-E. Precision Aluminum Castings. Hiram Brown. *American Foundryman,* v. 18, July 1950, p. 50-57.

The various factors involved in production of "precision" or high-quality Al castings. Recommended practices involved in obtaining high-quality metal. Sand, permanent-mold, die, plaster, investment, and centrifugal casting. Emphasizes mold materials and rigging practice. (E general, Al)

339-E. Establish Foundry Controls Through Laboratory Services. *American Foundryman,* v. 18, July 1950, p. 58-60.

Need for more use of chemical analysis, for checking coke charges, and for analysis of incoming materials. (E general, S11)

340-E. Precision Casting Grows Up. *Modern Industry,* v. 20, July 15, 1950, p. 93.

Uses by Allis-Chalmers, National Bronze & Aluminum Foundry Co., and American Brake Shoe. (E15)

341-E. Trends in Methods of Melting and Casting for High Conductivity Copper Wire Bars. R. H. Bauld. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals—A Symposium", 1950, p. 185-202; discussion, p. 227-244.

Previously abstracted from Preprint No. 7, July 1949. See item 14C-65, 1949. (E10, Cu)

342-E. Gases and Steel. Andrew McCance. *Engineering,* v. 169, June 30, 1950, p. 737-739. (A condensation.)

Previously abstracted from *Foundry Trade Journal.* See item 301-E, 1950. (E25, EG-m, CI)

343-E. Non-Ferrous Investment Casting. Hiram Brown. *Institute of British Foundrymen,* Paper No. 966, 1950, 16 pages. (Advance Copy).

Wax and plastic pattern making, investment materials and preparation, drying, gating, melting, pouring, and metallurgical considerations. Data for various Al alloys. (E15, Al)

344-E. Some Experiments in Sand Casting of Conductivity Copper. W. H. Glaisher. *Institute of British Foundrymen,* Paper No. 968, 1950, 4 pages (Advance Copy); also *Foundry Trade Journal,* v. 89, July 6, 1950, p. 3-6; discussion, p. 6.

Effects of various degassing and deoxidation treatments on the physical and mechanical properties of sand-cast test bars made from melts of electrolytic copper melted under charcoal covers. (E11, Cu)

345-E. Fluidity of Steel. J. E. Worthington. *Institute of British Foundrymen,* Paper 971, 1950, 7 pages (Advance Copy).

A method of standardizing pouring speed and some results. The way in which fluidity varies with different carbon contents; Fluidity of some alloy steels. 16 ref. (E25, ST)

346-E. Review of the South African Foundry Industry. H. G. Goyns. *Institute of British Foundrymen,* Paper No. 974, 1950, 9 pages (Advance Copy).

Extent and scope of the industry, making comparisons with foundries in other countries. Extent of the local market, types and number of foundries, tonnages involved, types of castings, plant and laboratory facilities, raw materials, sands, clays, refractories, design and feeding technique, costing and estimating, personnel, and welfare. Deals for the most part with iron and steel. (E general, A4, CI)

347-E. Rationalisation of Sand Preparation. J. F. Goffart. *Institute of British Foundrymen,* Paper No. 975, 1950, 9 pages (Advance Copy).

A suitable and rationally designed sand-handling plant. Reclamation; molding sands; granular structure; agglomerating and bonding agents; sand characteristics; various sand mills and their choice; and sand preparation, wetting, storage, and regeneration. (E18)

348-E. Loam and Dry-Sand Moulding in the Jobbing Foundry. D. Redfern. *Foundry Trade Journal,* v. 89, July 13, 1950, p. 37-43.

Typical heavy jobbing shop, where castings ranging from 2 to 40 tons in weight are produced, with the average weighing 3-15 tons. (E19, CI)

349-E. Research on Short Cycle Cast Irons. (In Japanese.) Nobuhisa Tsutsumi. *Journal of the Casting Institute of Japan,* v. 21, no. 1, 1949, p. 2-9.

Use of a metal mold shortens the malleabilizing cycle considerably. By use of a metal mold and a sand core, a pipe union having the structure of blackheart malleable iron, temper carbon, and ferrite ground, was produced by only 5-6 hr. annealing. (E19, J23, CI)

350-E. Effect of Impurities in Zinc Alloys on Their Castability. I. (In Japanese.) Tetsutaro Mitsuhashi, Kazuo Katori, Manabu Ueno, and Kingo Naoki. *Journal of the Casting Institute of Japan,* v. 21, no. 2, 1949, p. 2-10.

Effect of Pb was studied for the Zamak alloy series. It was found to be a very objectionable impurity. Small percentages can be neutralized by use of Mg. (E25, Zn)

351-E. Cupola Operation Using Poor Quality Coke. I. The Tuyere. (In Japanese.) Shigeo Shibuya. *Journal of the Casting Institute of Japan,* v. 21, no. 2, 1949, p. 11-20.

Tuyere design was studied in connection with use of poor coke. Experiments were conducted using a small cupola. (E10, CI)

352-E. Some Experiments on Use of Facing Sand in Green-Sand Molds for Spinning-Machine Parts. I. (In Japanese.) Umeharu Harada. *Journal of the Casting Institute of Japan,* v. 21, no. 4, 1949, p. 2-18.

Effects of moisture, grain size of facing sand, clay or bentonite binder, and addition of powdered graphite, coal dust or coke dust to facing sand, on the surface condition of the castings. Addition of some kinds of powdered carbon to facing sand having a moderate grain size and suitable moisture content is helpful in obtaining castings having a better surface condition. (E18, CI)

353-E. Utilizing Oxygen in Cupola Operation. (In Japanese.) S. Honda and K. Saito. *Journal of the Casting Institute of Japan,* v. 21, no. 4, 1949, p. 19-22.

Improved design arrangements for the above. Recommends intermittent use of O_2 for high-carbon cast iron and continuous injection for low-carbon irons. (E10, CI)

354-E. Cupola-Furnace Melting of Bronze. (In Japanese.) Masaji Itoh. *Journal of the Casting Institute of Japan,* v. 21, no. 5, 1949, p. 2-7.

Cupola furnace was adopted be-

cause of the shortage of graphite crucibles. It was found that cupola melting of bronze was satisfactory even when poor quality coke was used, but that melting loss was comparatively large. (E10, Cu)

355-E. Method of Casting Spinning-Machine or Loom Parts. I-II. (In Japanese.) H. Horiguchi. *Journal of the Casting Institute of Japan*, v. 21, no. 5, 1949, p. 8-19; no. 6, 1949, p. 1-8.

Part I. Various facing materials and their effects on surface conditions and blowhole formation in castings. Part II: Defects caused by warpage or moisture in the sand mold. Recommendations for pattern design and other procedures to minimize these defects. (E19, CI)

356-E. Some Notes on Gas Holes in Iron Castings Cast in Green Sand Molds. (In Japanese.) T. Kinoshita and M. Ogata. *Journal of the Casting Institute of Japan*, v. 21, no. 6, 1949, p. 8-13.

Experimental work conducted to minimize gas holes. Following conditions are recommended: Sand moisture less than 9%; sand permeability of 100 (AFS units); pouring temperature above 1300° C. (E19, CI)

357-E. Short-Cut Method for Determining Clay Content of Molding Sands. (In Japanese.) Taiji Yasuda and Etsuro Sekido. *Journal of the Casting Institute of Japan*, v. 21, no. 9, 1949, p. 1-5.

Experiments on the specific-gravity method. (E18)

358-E. Abrasion-Strength Testing Machine for Molding Sand. (In Japanese.) Unokiti Ouchi. *Journal of the Casting Institute of Japan*, v. 21, no. 9, 1949, p. 5-10.

The machine, method of operation, and typical results. (E18)

359-E. Foundry Practice for Large Pressure-Tight Copper Alloy Castings. (In Japanese.) Eizo Sumiyoshi and Saburo Koyasu. *Journal of the Casting Institute of Japan*, v. 21, no. 9, 1949, p. 10-14.

Recommended procedures and equipment for production of Cu alloy castings 120-295 kg. in weight, 10-20 mm. thick, and requiring absolute tightness against gas pressures of 7 kg. per sq. cm. (E11, Cu)

360-E. Studies on Sand Particles of Casting Sands. I. (In Japanese.) M. Lizumi. *Journal of the Casting Institute of Japan*, v. 21, no. 10, 1949, p. 1-5.

Effects of grain shape, size and distribution on properties of sand molds. Effects of the space between the grains. The maximum dimensions of these voids required to prevent intrusion of molten metal into the space between the grains. (E18, CI)

361-E. Research on the Semi-Permanent Mold. I. The Graphite Base Mold. (In Japanese.) Motoo Sumitomo and Shiro Terai. *Journal of the Casting Institute of Japan*, v. 21, no. 10, 1949, p. 6-12.

Nature of the graphite base mold, using sodium silicate and bentonite as binder, was studied. From the standpoints of green and dry strength, dry shrinkage, heat conductivity, and durability of the mold, the best result is obtained with a composition containing 10% bentonite, 18% Na_2SiO_3, and remainder graphite powder. (E19)

362-E. Studies of Gases Evolved on Solidification of Molten Cast Irons. I and II. (In Japanese.) Minao Nakano. *Journal of the Casting Institute of Japan*, v. 21, no. 10, 1949, p. 12-17; v. 22, no. 3, 1950, p. 7-12.

Results of study using an Orsat apparatus. Effects of changes in melting conditions, addition agents, and operating conditions. (E25, CI)

363-E. Research on Molding Sand Binders. II. (In Japanese.) T. Makiguchi. **Journal of the Casting Institute of Japan**, v. 21, no. 11, 1949, p. 1-5.

In order to determine the effects of chemical properties of molding sand binders on casting surface conditions, the strength of molds using many kinds of dry binders at elevated temperatures was investigated. Stability of sand grains on the mold surface depending upon kind of binder, was also examined. It appears that the less the difference between strength in the coagulated and sintered states, and the greater the strength of the sand grains, the better the properties of the binders. (E18)

364-E. Drying of Molds. 1. Drying Mechanism. (In Japanese.) Kenji Chijiiwa. *Journal of the Casting Institute of Japan*, v. 21, no. 11, 1949, p. 12-18.

In order to explain the above mechanism, rate of drying and temperature gradient were studied. Effects of air velocity, temperature, water content, etc., were determined. (E19)

365-E. Apparatus for Handy Measurement of Moisture in Molding Sand. (In Japanese.) Tadao Sato and Hideo Teramura. *Journal of the Casting Institute of Japan*, v. 21, no. 12, 1949, p. 1-5.

Apparatus measures change in electrical capacity by use of low-frequency resonanced current. (E18)

366-E. Decreasing the Sulfur Content by the Hot-Blast Cupola. (In Japanese.) Toshihiro Kinoshita and Masuo Nakashima. *Journal of the Casting Institute of Japan*, v. 22, no. 2, 1950, p. 16-26.

Results of experiments on refining iron for sulfur reduction in the hot-blast cupola. Reasons for the sulfur reduction. (E)

367-E. Study of a New Cupola With Multiple Rows of Tuyeres. (In Japanese.) M. Hamasumi and T. Sugiura. *Journal of the Casting Institute of Japan*, v. 22, no. 3, 1950, p. 1-7.

Experiments with a new cupola having four rows of tuyeres, each consisting of four tuyeres. Capacity is increased by 50% over the normal cupola, in spite of use of poor coke containing 20-25% ash. The cupola was operated with two types of blowers: a turbo-fan of 30 cu.m. per min. capacity and pressure of 250 mm. H_2O; and a Roots blower of 45 cu.m. per min. Capacity and pressure of 550 min. H_2O. Use of the higher pressure was advantageous. The new cupola proved more effective than use of oxygen and of lime-treated coke. (E10, CI)

368-E. Research on Green Molding Sands—Especially on "Buckling Defects". (In Japanese.) M Tanji and U. Ouchi *Journal of the Casting Institute of Japan*. v. 22, no. 3, 1950, p. 13-17.

Many defects which appear on the surfaces of castings are dependent on the expansion properties of sands upon sudden heating. Simple testing method for such defects, easily operated as a control procedure. (E18)

369-E. Studies on "Camlachie Cramp", Especially on Chaplets. (In Japanese.) T. Muraki. *Journal of the Casting Institute of Japan*, v. 21, no. 11, 1949, p. 5-12.

On the basis of the English abstract, the article is believed to deal with coatings on chaplets and their effects on heat transmission and structure at the fusion zone. The term "camlachie cramp" remains obscure. Heat-transmission effects were not investigated. Steel chaplets coated either by plating of scale formation were tested by pouring molten cast iron around them. Micro and macrostructures at the fusion zone are illustrated. (E19, CI)

370-E. Use of Chills in Producing Tin Bronze Castings. Clyde L. Frear. *Foundry*, v. 78, Aug. 1950, p. 76-77, 182-189.

Recommended practice in use of chills, chaplets, and antichills. Fourth and final article of series on the influence of various factors during the solidification of tin-bronze castings. (E25, Cu)

371-E. Producing Textile Machinery Castings. (Concluded.) Pat Dwyer. *Foundry*, v. 78, Aug. 1950, p. 78-81, 190-192.

Procedures and equipment for sand casting of iron parts in the foundry department of Whitin Machine Works. Includes cupola practice. (E11, E10, CI)

372-E. Plastic Bonded Shell Molds Used in New Casting Process. Bernard M. Ames, Seymour B. Donner, and Noah A. Kahn. *Foundry*, v. 78, Aug. 1950, p. 92-96, 206-217.

Basic fundamentals of the Croning or "C" process. Results of investigation of the applicability of heat-polymerized plastics as molding-sand binders for casting nonferrous or ferrous metals. (E19)

373-E. Origin and Control of Carbon in Ferrous Alloys. Harry A. Schwartz. *Foundry*, v. 78, Aug. 1950, p. 97, 135-136, 138-139. Reprinted from "Foundry Science", Pitman Publishing Corp., 1950.

The Fe-O-C equilibrium diagram and equilibria of the various phases involved. Application to melting practice in the cupola, reverberatory furnace, converter, etc. (E10, N8, Fe)

374-E. Mechanizes Production of Textile Machinery Castings. *Foundry*, v. 78, Aug. 1950, p. 146-147.

Equipment of Draper Corp.'s Hopedale, Mass., gray-iron foundry. (E11, T29, CI)

375-E. The Croning Process. *Foundry*, v. 78, Aug. 1950, p. 170-171.

Principal steps in production of castings by the so-called Croning or "C" process as demonstrated by Bakelite Division, Union Carbide & Carbon Corp. (E19)

376-E. Detroit Spending Millions on Foundry Process. Walter Patton. *Iron Age*, v. 166, Aug. 3, 1950, p. 89-90.

Research now under way in the automobile industry on the Croning resin-sand process, which was imported from Germany in 1947. Procedure and revolutionary importance of process in which auto makers are believed to have already invested $2 million. It may be used for precision casting of gray iron, steel, and aluminum. (E19, CI, Al)

377-E. New Process Casts Assembled Products. *Production Engineering & Management*, v. 26, Aug. 1950, p. 66.

Process developed by Gries Reproducer Corp. makes it possible to die cast two or interlinked movable elements in one operation. Examples are chains and scissors. Details are not given. (E13)

378-E. Water-Cooled Engine Block Gravity Die Cast. *Steel*, v. 127, Aug. 7, 1950, p. 86-87, 108.

Equipment and procedures for permanent-mold casting of complex twin-cylinder, water-cooled, aluminum engine. (E12, T21, Al)

379-E. Feature of Iron and Steel Foundry Is Flexibility. *Canadian Metals*, v. 13, July 1950, p. 20-23.

Foundry of Dominion Engineering Works, Lachine, Quebec. (E11, CI)

380-E. Refractories in the Foundry. W. F. Ford and J. R. Rait. *Refractories Journal*, v. 26, July 1950, p. 272-280.

Previously abstracted from *Foundry Trade Journal*, item 264-E, 1950. (E10)

381-E. Review of the South African Foundry Industry. H. G. Goyns. *Refractories Journal,* v. 26, July 1950, p. 283-287.

Extent and scope of the South African foundry industry, and comparisons with foundries in other countries. (E general)

382-E. The Use of Alloying Elements in Chilled Iron Rolls. Archibald Allison. *Metallurgia,* v. 42, June 1950, p. 9-13; July 1950, p. 63-66.

Practical and fundamental aspects of the manufacture of chilled iron rolls. Effects of alloying elements, preparing the charge, heat treatment, and casting. Second installment deals mainly with sampling for analysis and with microstructure of various compositions following various treatments. (E11, T5, CI)

383-E. Basic Principles of Die Design; Cores and Core Mechanisms. H. K. Barton and L. C. Barton. *Machinery* (London), v. 77, July 27, 1950, p. 113-120.

Design of dies for die casting. (E13)

384-E. Strickling a Five-Ton Cylinder Liner. S. Wade. *Foundry Trade Journal,* v. 89, July 20, 1950, p. 72-73.

Describes procedure. (E19)

385-E. Core Blowing in a Mechanised Foundry. S. Lane. *Foundry Trade Journal,* v. 89, July 20, 1950, p. 74.

Procedure. (E21)

386-E. Fluidity of Steel. J. E. Worthington. *Foundry Trade Journal,* v. 89, July 27, 1950, p. 87-93.

Previously abstracted from *Institute of British Foundrymen,* Paper 971, 1950. See item 345-E, 1950. (E25, ST)

387-E. Castings for Ships and Road Vehicles. A. G. Thomson. *Foundry Trade Journal,* v. 89, July 27, 1950, p. 103-106.

Sand casting of large parts in iron and nonferrous materials, by a British firm. (E11, T21, T22)

388-E. The Production of Refined-Copper Shapes. R. H. Waddington. *Institute of Metals,* "Symposium on Metallurgical Aspects of Non-Ferrous Metal Melting and Casting of Ingots for Working", 1950, p. 33-46.

Previously abstracted from *Journal of the Institute of Metals,* item 14C-14, 1949. (E10, C23, Cu)

389-E. The Application of Flux Degassing to Commercially Cast Phosphor Bronze. N. I. Bond-Williams. *Institute of Metals,* "Symposium on Metallurgical Aspects of Non-Ferrous Metal Melting and Casting of Ingots for Working", 1950, p. 61-74.

Previously abstracted from *Journal of the Institute of Metals,* item 14C-16, 1949. (E25, C5, C21, Cu)

390-E. Production in Converters, Characteristics, and Fields of Application of FAH Cast Irons. (In French.) M. Mallevialle. *Revue de Métallurgie,* v. 47, June 1950, p. 465-471; discussion, p. 471.

Method of production of different types of FAH cast irons (synthetic cast irons obtained by recarburization of molten steel in a Thomas converter). Each type of cast iron is comprehensively analyzed; its physical and chemical properties, and fields of application. Photomicrographs indicate the crystal structure of each individual type. (E11, M27, CI)

391-E. Design and Thermotechnical Problems of the Hot Blast Cupola. (In German.) Otto Günthner. *Neue Giesserei,* v. 37, (new ser., v. 3), June 1, 1950, p. 205-209.

The principles of hot-blast melting. Design of hot-blast cupolas, the blast heater in operation, control instruments, operation and cleaning, and results obtained. Results from different plants are compared and critically analyzed. Suggestions for improvements. (E10, CI)

392-E. Determining Ladle Contents While Pouring. (In German.) P. Sahmel and H. Pieper. *Neue Giesserei,* v. 37 (new ser., v. 3), June 1, 1950, p. 211-213.

Explains a method of calculating the amount of material remaining in the ladle from its angle of inclination. Graphs permit quick estimation of this amount. (E23)

393-E. Application of the Constitution Diagram of the Iron-Carbon-Silicon System in the Foundry. (In German.) K. Mühlbradt. *Neue Giesserei,* v. 37 (new ser., v. 3), June 1, 1950, p. 213-215.

The problems of melting machine-cast iron and the effects of Si addition to counteract a deficiency of carbon. (E25, CI)

394-E. A New Measuring Unit Used in Testing of Molding Sand. (In German.) W. Reitmeister. *Neue Giesserei,* v. 37 (new ser., v. 3), June 15, 1950, p. 225-231.

Proposes the use of the term "Specific Mold Volume" which is defined as the absolute mold volume divided by the absolute weight of a given dry or green sand. Experiments show a positive correlation between specific mold volume and gas permeability. Development of a standard for measuring sand grain sizes. (E18)

395-E. An Interesting Slag-Iron Reaction in the Mold. (In German.) F. Roll. *Neue Giesserei,* v. 37 (new ser., v. 3), June 15, 1950, p. 233.

Show how molten iron in the mold absorbed sulfur from a lump of slag. (E19, B21, Fe)

396-E. Surface Smoothness of Parts Cast in Metal Molds. (In Russian.) A. S. Smirnov. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 21.

Applied to the casting of steel. (E12, CI)

397-E. Introduction of Modified Cast Iron in Peat-Industry Machinery. (In Russian.) B. G. Grinberg. *Torfyanaya Promyshlennost* (Peat Industry), v. 27, Apr. 1950, p. 23-25.

Recommends modification of cast iron for construction of peat machines as the most economical and practical method of obtaining high-strength cast-iron parts. Method of modification. Physical properties of the material. (E11, T28, CI)

398-E. A Modern Iron Foundry. *Mining Magazine,* v. 82, Feb. 1950, p. 76-80.

New British foundry. (E general, CI)

399-E. Increased Activity Marks 1950 Apprentice Contest. Roy W. Schroeder. *American Foundryman,* v. 18, Aug. 1950, p. 28-31.

Prize-winning entries in steel and nonferrous divisions. (E general, A3)

400-E. Develop Gating Formula for Aluminum Alloy Castings. Alfred J. Howarth. *American Foundryman,* v. 18, Aug. 1950, p. 32-36.

Functions of gating systems. No exact formula for gating various types of castings has as yet been devised. The "formula" described consists merely of approximate dimensional rules for size of gate, number of gates, gate location, runner and sprue, cross-sections, chokes, screens, pouring time, and risers. Results of application of the rules to a specific example. (E22, Al)

401-E. Silica Sands—Sieve Analyses. A. I. Krynitsky and F. W. Raring. *American Foundryman,* v. 18, Aug. 1950, p. 40-43.

A study of sieve analyses of silica sand was undertaken to determine the precision of the AFS fineness test for foundry sands. Primary purpose was to determine whether the type of sieve shaker used has any significant effect on analytical results for a given sample, and reproducibility of a sampling technique. Vibratory and rotary sieve shakers give approximately the same results with the same set of sieves. (E18)

402-E. Modern Foundry Methods: Model Laboratory Provides Sand, Metal Research and Control. *American Foundryman,* v. 18, Aug. 1950, p. 44-45.

New development and control laboratory of U. S. Graphite Co., which contains complete facilities for studying foundry sands and refractories, mold and core washes, and their influence on castings. (E18)

403-E. Metallurgy of Iron Base Rolls. F. E. Sutherland. *American Foundryman,* v. 18, Aug. 1950, p. 46-51.

Depth of hardened layer, fundamental chemistry of chilled iron (effects of C, Si, Mn, S, P, Mo, Ni and Cr), metallurgy of chilled and grain-type rolls, running a heat, and effect of granular graphite additions. (E25, CI)

404-E. Discusses Core Oil Evaluation and Offers Data on Core Gas. Hiram Brown. *American Foundryman,* v. 18, Aug. 1950, p. 52-53.

Discusses "Core Oil Evaluation Method" by R. H. Olmsted (June 1950 issue, item 290-E, 1950). Core-gas test equipment and data on properties of a variety of core binders. (E21)

405-E. A.F.S. Foundry Glossary Defines Useful Foundry Terms. Part II. (Continued.) *American Foundryman,* v. 18. Aug. 1950, p. 54, 80-81, 85-91.

Covers "Brinell hardness" to "hearth". (To be continued.) (E general, A10)

406-E. Metal Parts With High Accuracy and Finish Produced by New Casting Process. B. N. Ames, S. B. Donner, and N. A. Kahn. *Materials & Methods,* v. 32, Aug. 1950, p. 43-46.

See abstract of "Plastic Bonded Shell Molds Used in New Casting Process", *Foundry,* item 372-E, 1950. (E19)

407-E. Precision Investment Steel Casting Alloys. *Materials & Methods,* v. 32, Aug. 1950, p. 77, 79.

Heat treatments, physical and mechanical properties, and general characteristics for 15 alloy, 18 tool, and 10 stainless steels. (E15, Q general, P general, J general, ST)

408-E. 22% Nickel Silver Precision Cast in Plaster Molds. *Nickel Topics,* v. 3, Aug. 1950, p. 5.

The process and a typical application. (E15, Cu)

409-E. Steelworks Castings. L. H. Williams. *Foundry Trade Journal,* v. 89, Aug. 3, 1950, p. 125-130.

British foundry for heavy steel castings. (E11, CI)

410-E. (Book) Casting Design as Influenced by Foundry Practice. Oliver Smalley. 62 pages. 1950. Meehanite Metal Corp., New Rochelle, New York.

General design rules, pattern making, molding and core making, gating, risering, and material selection. Also welding, hard surfacing, coating, and finishing of castings. (E general)

F

PRIMARY MECHANICAL WORKING

172-F. Stator Frame Rolling—A Hot Job. *Steel,* v. 127, July 24, 1950, p. 74. (F23, T25)

173-F. Fundamentals of the Working of Metals. Part XIII. Types of Failures Encountered During Metal Forming. George Sachs. *Modern Industrial Press,* v. 12, July 1950, p. 6, 8, 10.

Causes and methods of prevention. (F general, G general)

174-F. Drawbench Innovations Speed Line Production. *Steel,* v. 127, July 31, 1950, p. 65-66.

Continuous drawing, straightening, cutting, and polishing of both ferrous and nonferrous rods at a speed of 250 ft. per min. is possible with newly designed unit built by Loma Machine Mfg. Co. (F24)

175-F. Hot-Strip Rolling Mills; The Evolution of the Modern 4-High Mill. J. Malborn. *Sheet Metal Industries,* v. 27, July 1950, p. 581-594, 596.

Various types of the 4-high mill and their development. Data on gage thicknesses, percent reductions, temperature ranges, etc. (F23)

176-F. Forged Steel Rolls; A Review of Their Application and Manufacture. A. H. Waine. *Journal of the Iron and Steel Institute,* v. 165, July 1950, p. 279-286.

General application, potentialities, and advantages over chilled iron rolls. The three main groups, carbon steel, semi-hard alloy steel, and hardened steel, are dealt with separately, their methods of manufacture and particular applications in the hot and cold rolling industries. Hardenability curves show effect of soaking time and quenching temperature. Use, calibration, and maintenance of the scleroscope for determining surface hardness of rolls. Some unusual examples of failures in service.
(F22, T5, Q29, J26, ST)

177-F. Machine Forging. J. Lomas. *Machinery Lloyd* (Overseas Edition), v. 22, July 8, 1950, p. 95-97.

Machine forging as distinct from hammer forging and drop forging. Points to be observed when employing this process, and some formulas for the maximum upsetting possible. Modern developments in cold forging and heat treatments for the higher carbon steels are described. (F22, ST)

178-F. 18,000-Ton Hydraulic Forging Press Housed in Massachusetts Plant. *SAE Journal,* v. 58, Aug. 1950, p. 70-72. Based on "Required Production Facilities for Large Pressure Forgings" by George W. Motherwell.

Forging press, installed in new plant of Wyman-Gordon Co., Grafton, Mass. All tie-rods, cylinders, and other highly stressed parts are made of forged, heat treated, alloy steel. (F22, T5, AY)

179-F. Heavy Commercial Forgings. G. T. Jones. *Mechanical Engineering,* v. 72, Aug. 1950, p. 629-633.

Various types, giving details of methods and equipment for their production. (F22, ST)

180-F. Designing Low-Cost Forgings. J. J. Sloan and K. R. Denny. *Machine Design,* v. 22, Aug. 1950, p. 154-156.

Principles of design of die forgings. (F22)

181-F. Aluminum Die Forging Design for Quality and Economical Production. A. E. Favre and A. J. Orazem. *Product Engineering,* v. 21, Aug. 1950, p. 140-144.

Information is based on experience gained in solving numerous forging-design problems. (F22, Al)

182-F. Mechanical Die Cutting Breaks Production Bottleneck. A. Plimmer. *Steel,* v. 127, Aug. 7, 1950, p. 90-92.

Methods for automatic reproduction of plaster or wooden "masters" in blocks of iron and steel which are largely responsible for modern mass production of parts in precision molds and dies. (F22)

183-F. Production of Bars. C. W. Barrett. *Steel,* v. 127, Aug. 7, 1950, p. 94, 96, 98, 101, 104, 106; Aug. 14, 1950, p. 94, 96, 99-100.

Contrary to popular notion, bar mills are not confined to the production of bars. Products such as rods, billets, slabs, plates, skelp, and other material may all be rolled on a bar mill. Second installment continues description of the various types of bar mills operating today. Also typical problems encountered and their possible solutions in the rolling of special bar shapes. (F23)

184-F. A Peep Into the Crystal Ball. *Mainspring,* v. 13, Aug. 1950, p. 1-4.

Elementary discussion of the theory of ordinary and "backpull" or "reactive" wiredrawing. Theoretical advantages of the latter process and the possibility that it will replace conventional wire drawing. (F28)

185-F. Making Seam-Welded Tubing. A. I. Nussbaum. *Welding Engineer,* v. 35, Aug. 1950, p. 30-34.

Equipment and procedures of Electriweld Tube Div., Jones & Laughlin Steel Corp. Mild steel tubing in the range from ½ in. o.d. x 22 BWG to 4 in. o.d. x 10 BWG can be produced, as well as a variety of square, rectangular, and other noncircular tube shapes. Major operations are cold roll forming and electric welding. Advantages of the process. (F26, CN)

186-F. Present Status of the Art of Molybdenum Fabrication. Carl E. Swartz. *Metal Progress,* v. 58, Aug. 1950, p. 181-184.

Article is based on a survey made for the NEPA Project (Nuclear Energy for Propulsion of Aircraft). It was found that massive pieces weighing up to 1000 lb. can be produced; and that the metal is workable, hot or cold, by conventional methods. Workability, including ability to be forged; rolled, extruded, deep drawn, cold drawn, spun, welded, brazed, and surface coated at high temperatures (hot-dipped Al, cladding, enameling, and Mo disilicide coating). Work on binary alloys.
(F22, F23, G general, L general, K general, Mo)

187-F. Hot Forging of Commercial Titanium. Joseph Maltz and Vincent De Pierre. *Metal Progress,* v. 58, Aug. 1950, p. 189-191.

Commercial Ti containing 0.78% C has been hammer forged successfully between 1875 and 1450° F. with regular production equipment. Experimental drop forgings have also been produced. Work was done at U. S. Naval Gun Factory, Washington, D. C. (F22, Ti)

188-F. Production of Aluminum Sheet and Plate in Large Sizes. *Metal Progress,* v. 58, Aug. 1950, p. 193-196.

Melting and ingot casting, scalping and preheating, and hot and cold rolling, at new Alcoa plant near Davenport, Iowa. (F23, C5, Al)

189-F. Slab Slicer Eliminates Common Shear Troubles. *Steel,* v. 127, Aug. 21, 1950, p. 100, 102.

Positive control of the slab, elimination of depressing table back of the shear, quick release of sheared slab portions, and unobstructed access to the shear throat are some of the many advantages of a German-developed, open-side, up-and-down-cut slab shear currently in service at Rotary Electric Steel Co. The shear is of 700-ton capacity, capable of cutting 12 x 12-in. blooms and slabs 40 in. wide by 3½ in. thick. (F29)

190-F. Output Gains as "Bends" Go Out. *Steel,* v. 127, Aug. 21, 1950, p. 106.

Equipment for straightening cold drawn nonferrous tubing. Three sets of crossed rolls provide permanent deformation of tubing to bring about perfect straightness.
(F29, EG-a)

191-F. Compression-Formed Steel Tubing Offers Close Tolerances and High Strength Properties. L. A. Karg. *Materials & Methods,* v. 32, Aug. 1950, p. 52-55.

The compression-forming process; available types, shapes, and sizes; tolerances; finish and decarburization; and mechanical properties.
(F26, ST)

192-F. Extruded Metal Shapes and Their Uses. T. C. Du Mond. *Materials & Methods,* v. 32, Aug. 1950, p. 65-76.

The process, suitable shapes, advantages and limitations, costs, extrudable metals, and typical applications. Of major commercial importance are Al, Mg, and Cu and their alloys. Extrusion of steel and Ni alloys is also mentioned.
(F24, Al, Mg, Cu)

193-F. Borax as a Coating for Drawing High Carbon Steel Wire. Curtis Voigtlander. *Wire and Wire Products,* v. 25, Aug. 1950, p. 656, 684-685.

Procedures and experiences of Union Wire Rope Corp., Kansas City, Mo. (F28, CN)

194-F. Wire Finishes and Trade Requirements. C. R. Mehl. *Wire and Wire Products,* v. 25, Aug. 1950, p. 657-658, 685.

Wire finishing including the use of borax compounds vs. lime coating. Deals with both ferrous and nonferrous wire. (F28)

195-F. Cold Drawing. IV-V. L. Sanderson. *British Steelmaker,* v. 16, July 1950, p. 364-367; Aug. 1950, p. 421-424.

A metallurgical explanation for the higher degree of hardness and tensile strength which a cold drawn wire possesses over the rod from which it is made. Three different methods of cold drawing tubes; also tube-drawing machines and tube-drawing dies. The cold drawing of steel sheets and the defects encountered form the concluding section. (F28, F26, G4, ST)

G

SECONDARY MECHANICAL WORKING

225-G. Knit Wire Finds New Applications. E. F. Ross. *Steel,* v. 127, July 24, 1950, p. 65-66, 79.

Equipment and procedures of Letraw Mfg. Co., Chicago which knits about 30,000 lb. of 0.005-0.011-in. steel and copper wire each week on 55 special machines. Varied uses, the most familiar of which are the pot

cleaners used by the housewife.
(G general, T10, Cu, ST)

226-G. Collapsible Tubes in Aluminium Plastic Laminate. *Light Metals,* v. 13, July 1950, p. 380-385.

Equipment and procedures for production of above by ATF Incorporated, Elizabeth, N. J. Al foil coated on both sides with plastics, is impact extruded into tubes.
(G5, Al)

227-G. Coin-Dimpling; Counter-Pressure Process for the Accurate Control of Rivet-Head Form. Part II. Machines and Equipment. *Aircraft Production,* v. 12, July 1950, p. 221-226.

Notes on procedure based mainly on the practice of Canadair, Ltd.
(G2, K13, T24)

228-G. "Super Machining" Steels Increase Production 100%. E. F. Ross. *Steel,* v. 127, July 31, 1950, p. 60-62, 84, 86, 88-89.

Automatic screw-machine shops report excellent performance for the improved free-machining Bessemer and lead-bearing rephosphorized and resulfurized openhearth steels. Much longer tool life, reduced down time, higher cutting speeds and feeds, increased operating efficiencies are some of the advantages claimed.
(G17, CN)

229-G. Steel Does the Dirty Work. Eleanor Harvill. *Steelways,* v. 6, July 1950, p. 24-25.

An elementary description of the manufacture and uses of steel wool. Steel wire travels past stationary steel knives which gouge out triangular threads of "wool". Average analysis of the wire is 0.12% C, 0.90% Mn, 0.10% P, and 0.04% S.
(G15, CN)

230-G. Tool and Temper Know-How Solves Forming Problems on Copper Alloys. P. B. Tursi. *Materials & Methods,* v. 32, July 1950, p. 58-59.

Shows by two examples that incorrect forming tool specifications are often to blame for cracks and rejects, rather than poor material.
(G general, Cu)

231-G. How To Fabricate Molybdenum. Jack Chelius. *Materials & Methods,* v. 32, July 1950, p. 45-48.

Recommended procedures for forming, including punching, shearing, drawing, and spinning; stress-relief annealing; machining; joining (brazing and welding); and surface finishing.
(G general J1, K general, L general, Mo)

232-G. Paint Containers. *Paint Manufacture,* v. 20, July 1950, p. 243-248.

Development of the metal container industry, the technique of container manufacture and some of the legal and technical considerations involved. Rolling, blanking, welding, and finishing equipment and procedures.
(G general, K general, L general, CN, Sn)

233-G. Successful Variation in Metal Fabrication. Howard E. Jackson. *Modern Industrial Press,* v. 12, July 1950, p. 13-14, 16, 18, 38.

Miscellaneous equipment and procedures of Flohr & Co., Seattle, in production of heavy equipment. Forming, welding, stamping, hole punching, shearing, etc.
(G general, CN)

234-G. Fabrication of Kitchen Utensils at Foley Mfg. Co. Gerald E. Stedman. *Modern Industrial Press,* v. 12, July 1950, p. 20, 22, 24.

Procedures and equipment. Miscellaneous press operations, passivation, and hot-dip tinning.
(G1, L16, T10, CN)

235-G. Creating Modern Silverware. Parts I and II. Frank C. Mesle. *Plating,* v. 37, July 1950, p. 736-740; Aug. 1950, p. 845-849.

Picture story of equipment and procedures of Oneida Ltd., Oneida, N. Y. Blanking, shearing, embossing, forming, brazing, polishing, and grinding operations. Nickel silver (18% Ni, 18% Zn, 64% Cu) is the base metal used. Part II: Polishing, buffing, and plating operations. How research, development, and testing activities play an important role in the production of quality silverware.
(G general, L general, T10, Cu)

236-G. Accuracy in Machining—Its Standardisation and Cost. T. H. Vogel. *Engineers' Digest,* v. 11, July 1950, p. 245-250.

Need for more systematic and realistic establishment of tolerances. Details of a short investigation of the rise of manufacturing cost with increasing accuracy using the ISA System, which is explained. (G17)

237-G. Electronic Robot Boosts Lathe Output 700 Pct. *Iron Age,* v. 166, Aug. 3, 1950, p. 73-74.

Control unit which opens way for unskilled operators to increase machine-tool output tremendously. Designed for manually operated machines on job orders or short runs, it permits exact repetition to close tolerances. Setup of control is relatively easy and fast. Holes punched in a roll of paper control the sequence of operations. (G17)

238-G. Fundamentals of Cutting Fluid Action. M. Eugene Merchant. *Lubrication Engineering,* v. 6, Aug. 1950, p. 163-167, 181.

Basic functions; cooling; friction reduction; cutting ratio; benefits of friction reduction; mechanism of friction reduction; and cooling vs. friction reduction. Table gives observed reduction in friction between chip and cutting tool by applying cutting fluid, compared with calculated maximum reduction predicted from shear strength of solid film for iron, copper, aluminum, and lead. (G21)

239-G. Hole Drilled Half Diameter of Human Hair. *Steel,* v. 127, Aug. 7, 1950, p. 88.

Special technique and apparatus used to produce hole 0.0006 in. diam. in a piece of platinum. An electrical instrument was necessary to show when the drill made contact with the metal. (G17, Pt)

240-G. Stamped Jet Engine Parts Made by Special Techniques. *SAE Journal,* v. 58, Aug. 1950, p. 28-32. Based on "Precise Methods of Fabricating Sheet Metal Parts" by W. C. Heath.

Various difficult fabrication jobs on Inconel and stainless, including stamping, forming, shearing, piercing, machining, and welding (varied processes.)
(G general, K general, T25, Ni, SS)

241-G. SAE Shot Peening Group Searches for Method To Forecast Shot Life. *SAE Journal,* v. 58, Aug. 1950. p. 76-77.

Round-table discussion of results obtained with the Pangborn, the American Wheelabrator, the Alloy Metal Abrasive, and the Mattson-Cargill shot testers. (G23)

242-G. How To Micro-Finish Carbide Tools. David Kauffman. *Tool Engineer,* v. 25, Aug. 1950, p. 20-22.
(G19, T6, C)

243-G. Metal-Stamping Operations and Die Design. Part I. S. E. Rusinoff. *Tool Engineer,* v. 25, Aug. 1950, p. 26-28.

Equipment and procedures. Principles of die design are clarified by diagrams. (G3)

244-G. Unusual Press Set-Ups Used in Producing Washing Machine Parts. A. E. Sweet *Machinery* (American), v. 56, Aug. 1950, p. 144-150.

Forming, shearing, and welding of steel and Al parts by Maytag Co.
(G1, ST, Al)

245-G. Die That Eliminates Ten Operations. *Machinery* (American), v. 56, Aug. 1950, p. 182.

Combination blanking and forming die illustrated has enabled the time required for forming Al spray rails for boats to be reduced by more than 80%. The new die permits the entire rail to be formed in one operation, as compared with 11 operations previously required.
(G2, G3, Al)

246-G. How U. S. Radiator Makes Radiant Baseboards. A. H. Allen. *Steel,* v. 127, Aug. 14, 1950, p. 82-84.

The old-fashioned steam radiator has now become an unobtrusive baseboard with an accompanying construction change from cast iron to pressed steel. Equipment and procedures for their fabrication by U. S. Radiator Corp. Press operations, spot and flash welding, and brazing are used.
(G1, K3, K8, ST)

247-G. Scrapping Big Wheel. *Welding Engineer,* v. 35, Aug. 1950, p. 20-21.

Use of powder-cutting method on 16-ft. flywheel. (G22, CI)

248-G. Metal Transfer in the Cutting Process. Milton C. Shaw and Charles D. Strang, Jr. *Tool & Die Journal,* v. 16, Aug. 1950, p. 36-37, 66.

Previously abstracted from *Journal of Applied Physics,* item 153-G, 1950. (G17, AY)

249-G. Sawing of Magnesium. *Edgar Allen News,* v. 29, July 1950, p. 613-616.

Equipment and procedure involving the use of tungsten carbide tips on the saws. (G17, T6, C)

250-G. Metal Cutting: Art to Science. Hans Ernst. *American Society for Metals,* "Machining—Theory and Practice", 1950, p. 1-4.

A brief history of the development of metal cutting. (G17)

251-G. Metal Cutting Research—Theory and Application. M. Eugene Merchant. *American Society for Metals,* "Machining—Theory and Practice", 1950, p. 5-44.

Metal-cutting fundamentals, test methods, work materials, their mechanical properties and microstructure, and cutting tools and fluids. Concerned with various steels, Al, Cu, and brass. 14 ref.
(G17, Q general, M27, ST, Al, Cu)

252-G. Cutting Fluid Theory. Milton C. Shaw. *American Society for Metals,* "Machining—Theory and Practice", 1950, p. 45-68.

Results accomplished by cutting fluids and some of their limitations when used on Fe, Al, Cu, SAE 1020 steel, and 18-8 stainless steel.
(G21, ST, Al, Cu, CN, SS)

253-G. Materials and Machinability. Francis W. Boulger. *American Society for Metals,* "Machining—Theory and Practice", 1950, p. 69-109.

Machinability, surface finish, and the influence of materials and their mechanical properties. 33 ref.
(G17, Q general)

254-G. Development of the Macrostructure of Metals by Machining. L. M. Clarebrough and G. J. Ogilvie. *American Society for Metals,* "Machining—Theory and Practice", 1950, p. 110-122.

Shows that transverse markings exist on lead crystals after machining and that marking variations are responsible for development of macrostructure. Markings are transverse irregularities formed from a built-up edge and their formation correlates with crystal orientation.
(G17, M28, Pb)

255-G. Metallurgy and Machinability of Steels. J. D. Armour. *American Society for Metals*, "Machining—Theory and Practice", 1950, p. 123-168.

Machining tests on carbon, alloy, and stainless steels using automatic screw machines. Includes data sheets of surface cutting speeds for various grades of these steels and of cutting speeds and feeds for standard tools. (G17, AY, CN, SS)

256-G. Tool Steels. George A. Roberts. *American Society for Metals*, "Machining — Theory and Practice", 1950, p. 169-198.

Principal characteristics required for machining other materials, classification of the toolsteels used for machining, and the three main classifications used for machining carbon, medium-alloy, and high speed steels. Composition and properties of each. 10 ref. (G17, Q general, TS)

257-G. Cemented Carbide Tool Materials. John C. Redmond. *American Society for Metals*, "Machining—Theory and Practice", 1950, p. 199-217.

Nature of tungsten carbide compositions and the design and use of tools. (G17, T6, C, W)

258-G. Heat in Metal Cutting. A. O. Schmidt. *American Society for Metals*, "Machining—Theory and Practice", 1950, p. 218-340.

The calorimetric process applied to power determination in drilling; calorimetric power measurements in milling, workpiece surface and subsurface effects of machining; tool wear, chip formation, cutting speed, and milling high-strength alloys at elevated temperatures. Data on production runs with carbide milling cutters. Data for Al, brass, bronze, cast and malleable iron, and a variety of steels. 26 ref. (G17, S16, Al, Cu, CI, ST)

259-G. Evaluation of Machinability of Rolled Steels, Forgings and Cast Irons. Michael Field and Norman Zlatin. *American Society for Metals*, "Machining—Theory and Practice", 1950, p. 341-376.

Determination of machining characteristics of metals and their application toward more economical machining operations. Effect of microstructure, work hardening capacity, coefficient of friction between chip and tool, and shearing strength of the metal being cut. Includes micrographs. (G17, ST)

260-G. Tool Life Testing. Orlan W. Boston. *American Society for Metals*, "Machining—Theory and Practice", 1950, p. 377-408.

Types of tool failure, methods used to evaluate tool life, cutting speed and tool-life relation, wear vs. surface finish, and flank wear on carbide tools. An example of complete failure in high speed steel tools. Data for toolsteel, carbon steel, and monel. (G17, Q9, TS, CN, Ni)

261-G. Some Metallurgical Aspects of Grinding. L. P. Tarasov. *American Society for Metals*, "Machining—Theory and Practice", 1950, p. 409-464.

Reviews things that have been learned about the grinding process in relation to the metal being ground. Nature of the grinding process, grindability, surface cracking, grinding burn, grinding stress, surface injury, and factors contributing to it. Alloy and tool steel. Includes micrographs. 22 ref. (G18, AY, TS)

262-G. Economics of Machining. W. W. Gilbert. *American Society for Metals*, "Machining — Theory and Practice", 1950, p. 465-485.

Methods for decreasing cutting costs by increasing rate of metal removal. Tool life and corresponding cutting speed can be computed for minimum cost or maximum production rate. Methods for checking power capacity. Costs can also be reduced by reducing tool-changing cost, regrinding cost, and idle, loading, or noncutting cost. 14 ref. (G17)

263-G. Press Shop Methods in Torque Converter Production. Charles H. Wick. *Machinery* (London), v. 77, July 20, 1950, p. 67-74.

The hydraulic torque converter for the automatic transmission used on Chevrolet cars is made from precision stampings, spot welded and copper-brazed to pressed metal housings. Stamping and joining equipment and procedure. (G3, K3, K8, T21, ST)

264-G. Hot Machining for Tough Alloys. Henry Janes. *Machinery* (London), v. 77, July 20, 1950, p. 75-78.

Work of Sam Tour & Co., New York, on "hot machining". Data for carbon and alloy steels and for Allegheny Ludlum's high-temperature alloy S-816 are tabulated. (G17, CN, AY, SG-h)

265-G. "Powder Cutting" of Ferrous and Non-Ferrous Metals. *Engineering*, v. 170, July 21, 1950, p. 57.

British equipment and processes. Table gives operating conditions for powder cutting of stainless steel. (G22)

266-G. Oxygen-Electric Arc Cutting. (In German.) Hans Schmidt-Bach. *Neue Giesserei*, v. 37 (new ser., v. 3), June 1, 1950, p. 210-211.

The method and its fields of application. (G22)

267-G. Threading Parts of Austenitic Steel. (In Russian.) N. N. Zorev. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 15-17.

Influence of lead angle of cutting, rake angle, main plane angle (of enclosed cone), rate of cutting, pitch of thread being cut, and use of cooling-lubricating liquids on strength of thread cut by a high-speed cutting disk on a typical austenitic steel was investigated. (G17)

268-G. Influence of Wear of Cutting Tool on Microgeometry of Surfaces. (In Russian.) P. P. Grudov and Kh. V. Levant. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 17-18.

Experimentally investigated on gray cast iron with tools having hard-alloy cutting tips and also on "steel 40X" using low-alloy high-speed steel tools, the latter being cooled during cutting. Data on the influence of tool wear on microfinish of the surface, of time of work and cutting speed on tool wear, and of tool wear and cutting speed on surface finish. (G17)

269-G. Dependence of Applied Force on Rate of High-Speed Cutting of Metals. (In Russian.) T. N. Lopadze and A. I. Betaneli. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, May 1950, p. 16.

Dependence of cutting force on cutting rate and on lead angle of cutting tool was investigated. Influence of cutting rate is explained on the basis of its temperature effect on cutting and on rate of deformation. (G17)

270-G. Cylinder Head Broaching Tools Feature Carbide Inserts. *Iron Age*, v. 166, Aug. 17, 1950, p. 96-97.

It was found that broaching cutters with carbide-tipped roughing teeth and solid carbide blade-type finishing teeth increase between-grind life of the blades from 3000 to 65,000 pieces in finishing two faces and two sides of a gray-iron cylinder-head casting. (G17, T6, CI, C)

271-G. Fabrication of Titanium and Zirconium. A. M. Bounds and H. W. Cooper. *Metal Progress*, v. 58, Aug. 1950, p. 185-188.

Practical information of commercial value on bending, drawing, forming, machining, and welding. (G general, K general, Ti, Zr)

272-G. Dies for a Malleable Production Foundry. K. L. Sanders. *American Foundryman*, v. 18, Aug. 1950, p. 24-26.

Dies used in the straightening of castings to produce dimensional accuracy. (G1, E24, CI)

273-G. Airspeed Ambassador. Part I. General Design and Basic Manufacturing Methods; Hole-Piercing; Rubber-Die Press-Forming. Section-Manipulation. Part II. Forming Reflexed Components on the Hufford Machine; Press-Brake Technique; Fuselage Structure, Frame-Subassemblies, Stringer-Drilling. S. C. Poulsen. *Aircraft Production*, v. 12, July 1950, p. 213-219; Aug. 1950, p. 241-247.

Equipment and procedures for manufacture of British plane. (To be continued.) (G general, T24, Al)

274-G. Nickel-Alloy Sheet; Some Notes on Spinning, Drawing, Shearing and Perforating Monel, Nickel and Inconel. *Aircraft Production*, v. 12, Aug. 1950, p. 257-259. (G general, Ni)

275-G. (Book) **Machining — Theory and Practice.** 504 pages. 1950. American Society for Metals, 7301 Euclid Ave., Cleveland 3. $6.50.

Contains 13 papers by various authors on metal cutting, cutting fluid, materials and machinability, macrostructure, heat in metal cutting, and economics of machining. Papers are abstracted separately. (G17)

276-G. (Book) **Universal-Schnitt- und Stanzwerkzeuge.** (Universal Cutting and Forming Tools.) G. Oehler. 135 pages. 1950. Carl Hanser Verlag, Munich 27, Germany. 780 DM.

Press-tool design and construction, particularly the application of German standards for tool sets, the selection of die steels, and their correct heat treatment. Examples of blanking, forming, bending, curling, and deep drawing tool design. Considerable space is devoted to the calculation of working pressures for various component forms and materials. (G general, T6)

H

POWDER METALLURGY

63-H. New Type of Stainless Steel Powder Develops High Green Strength. George Stern. *Materials & Methods*, v. 32, July 1950, p. 52-54.

Two grades of stainless powder made by a new method. Grade 140 is essentially 14% Cr, balance Fe; Grade 188 17-18% Cr, 8-9% Ni. These powders have good green strength and moldability. Physical and mechanical properties of the powders, the compacts, and the sintered bodies. Micrographs show stainless-steel powder infiltrated with Cu and Ag. (H11, SS)

64-H. Iron Powder as Raw Material. (In German.) C. P. Debuch. *Umschau*, v. 50, July 1, 1950, p. 411-414.

Production of iron powder, its properties, pressing, and sintering into finished articles and machine parts. (H general, Fe)

J

HEAT TREATMENT

167-J. How To Evaluate Induction Heating for Forging, Forming. *Steel,* v. 127, July 24, 1950, p. 58-60.

Procedures and applications to forging, heat treatment and heating for various forming operations. (J2, F22, G general)

168-J. How To Cut Heat-Treat Costs. Roy F. Kern. *American Machinist,* v. 94, July 24, 1950, p. 134-139.

Use of analysis of general heat treating practices, careful equipment selection, scientific shop layout, sound metallurgical control, and planned preventive maintenance. (J general)

169-J. Scale Reduction in Controlled Atmosphere Cycle Annealing. D. A. Payntor. *Industrial Gas,* v. 29, July 1950, p. 10-12, 21-24.

Furnace construction, atmosphere composition, furnace cycle, production rates, and operation costs involved in handling parts of A8620 composition at rates up to 3400 lb. per hr., at Salisbury Axle Works. (J23, AY)

170-J. New Quenching Methods Avoid Cracking—Improve Performance. J. H. Chapman. *Western Metals,* v. 8, July 1950, p. 22-23.

The austempering and martempering processes, their advantages, and applications. (J26, ST)

171-J. Combination Quench Reduces Aluminum Warpage. Glen A. Robinson. *Iron Age,* v. 166, July 27, 1950, p. 55-57.

When solution heat treating aluminum, Northrop Aircraft quenches first in "fog", then in water. Warpage is cut to a point where little or no straightening is required. Physical properties are shown to be equal to those developed by plain water quenching. (J27, Al)

172-J. Stress Relief. *Metal Progress,* v. 58, July 1950, p. 79-80, 112, 114, 116, 118.

Relief of excessive fabrication stresses is especially important in large welded structures. T. McLean Jasper outlines four possible methods using heat or prestressing and Wm. C. Stewart presents some data on magnitude of stresses remaining after definite heat treatments. (J1, G23, ST)

173-J. Steering Parts Heat Treated Continuously at Nash Motors. *Industrial Heating,* v. 17, July 1950, p. 1144-1146, 1148.

Equipment and procedures. (J general, T21, ST)

174-J. Use of Improved Tools Lowers Production Costs in Commercial Heat Treating. *Industrial Heating,* v. 17, July 1950, p. 1176, 1178, 1186.

Equipment and procedures of Pittsburgh Commercial Heat Treating Co., Pittsburgh, Pa. (J general, A5)

175-J. Effect of Time on the Tempering of Steel. (In Czech.) Ladislav Jenicek and Vlastimil Dlouhy. *Hutnicke Listy,* v. 5, Apr. 1950, p. 149-155.

On the basis of examples from the literature and from the authors' experience, it is shown that hardness change may not be directly related to changes in other mechanical properties. The same comment applies to dimensional stability after quenching. 26 ref. (J29, ST)

176-J. Studies on the Quenching Velocity of Complex Light Alloys. (In Japanese.) Takuichi Morinaga and Yuzo Nakanishi. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 6-9.

Temperature of the specimens (three standard shapes) during quenching was recorded on photographic paper by means of an oscillograph connected to a thermocouple inserted in the specimen. Results are given for the quenching ability of water, soybean oil, and air at various temperatures. Water is shown to be superior to the other media. (J26, Al, Mg)

177-J. The Mild Carburization of Chromium Steel. V. The Meaning of Case-Depth Measurement. VI. Development of Three Equations of Carburization. (In Japanese.) Hisao Matsumoto. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 18-23.

Part V: The various methods of case-depth measurement and comparison of results. Part VI: Three equations are developed and applied to carburization of plain carbon and alloy steels. (J28, ST)

178-J. Study on the Quick Annealing of Black Heart Malleable Cast Iron. (In Japanese.) I. Shizuya Maekawa and Takeshi Yamashita. II. Shizuya Maekawa, Takeshi Yamashita, and Tetsuji Yamaguchi. *Journal of the Casting Institute of Japan,* v. 21, no. 12, 1949, p. 5-21.

Part I: Range of white cast iron; effects of melting temperature; effects of graphitization velocity; change of microstructure on heating; determination of time of complete graphitization; and conditions for quick annealing process. Part II: Casting of white cast iron and its graphitization velocity; relationship of chemical composition and annealing conditions; mechanical properties resulting from quick annealing; microstructure at various stages of annealing; and ideal chemical compositions and treatments. (J23, N8, CI)

179-J. Electric Furnaces Anneal Jet Engine Parts. *Iron Age,* v. 166, Aug. 3, 1950, p. 84.

At Solar Aircraft Co., San Diego, Calif. Parts are stainless steel. (J23, SS)

180-J. Steam Treated Tools Last Longer. *Tool & Die Journal,* v. 16, Aug. 1950, p. 46, 48.

New heat treating procedure using an electrically heated furnace of the forced convection type, in which a steam atmosphere is circulated by a high-pressure fan. Steam reacts with the surface of the steel to produce a thin film of blue magnetic iron oxide, Fe_3O_4, which has good resistance to corrosion, and can retain cutting and lubricating oils. (J2, TS)

181-J. How Cleveland Pneumatic Heat Treats Giant Forgings. *Steel,* v. 127, Aug. 14, 1950, p. 102, 105.

Various types of equipment for a number of heat treating operations. (J general)

182-J. Heat Treatment of Non-Ferrous Metals. H. V. Kinsey. *Canadian Metals,* v. 13, July 1950, p. 11-15, 48.

Practical procedures and effects on structures of the metals. Includes paragraphs on recrystallization, cold working effects, grain size effects, recovery, age hardening, diffusion, and precipitation. (J general, N general, EG-a)

183-J. Modern Furnace for Flash Annealing. *Canadian Metals,* v. 13, July 1950, p. 16, 47.

Equipment and procedure of British firm, used for flash annealing of Al and Al alloys. (J23, Al)

184-J. Flame Hardening. E. F. Green. *Canadian Metals,* v. 13, July 1950, p. 32-35, 44-45.

Equipment and procedures for application to iron and steel. (J2, ST)

185-J. Annealing of Alloy Toolsteel After High-Frequency Tempering. (In Russian.) I. N. Kidik. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, May 1950, p. 22-23.

Influence of conditions of annealing on hardness and impact strength. Such influence was found to be dependent upon structural changes within the steel brought about by the tempering treatment. (J23, J29, TS)

186-J. Nitriding the Martensitic Stainless Steels. Part I. Howard E. Boyer. *Steel Processing,* v. 36, July 1950, p. 353-357.

Classification of stainless steels into three different groups. Data confined mainly to Class 1 group—the martensitic type. Includes depth-hardness curves for six different high-alloy steels. (To be continued.) (J28, SS)

187-J. Rapid Tempering by Induction Heating. Joseph F. Libsch. *Metal Progress,* v. 58, Aug. 1950, p. 176-180.

Short-time tempering by induction heating may be applied successfully to plain carbon and low-alloy steels, provided that temperature is increased to compensate for the short time of exposure. Includes tempering curves for 1050 and 3140 steels, graphs correlating mechanical properties and heat treatment, and a table of tempering treatment vs. hardness and impact energy for 4150 steel. (J29, J2, CN, AY)

188-J. Cylindrical Parts Induction Heated in Continuous High Speed Production. W. L. Corteggiano. *Steel,* v. 127, Aug. 21, 1950, p. 94-95, 104.

See abstract of "Production Case Hardener," *Machine Design,* item 160-J, 1950. (J28, ST)

189-J. Flame Hardening Now Widely Used for Surface Hardening Steels and Irons. E. F. Green *Materials & Methods,* v. 32, Aug. 1950, p. 56-59.

Applicability to various steels and irons; auxiliary quenching and stress-relieving steps which are often necessary; methods, equipment, and fuels; testing and inspection. (J2, ST)

K

JOINING

430-K. Transmission Parts Silver Soldered by Induction Heat. *Steel,* v. 127, July 24, 1950, p. 62. (K7, T1, ST)

431-K. Structural Aluminum Welded by New Process. *American Machinist,* v. 94, July 24, 1950, p. 149.

Application of Aircomatic gun process by Mid-States Ornamental Iron Works, Kansas City, Mo., for high-speed production of structural members of Al awnings. (K1, Al)

432-K. Stem Welding by the Thermit Process. Robert L. Holliday. *Producers Monthly,* v. 14, July 1950, p. 24-25.

As applied to oil-well drill stems. (K4, T28, ST)

433-K. Speed and Uniformity in Joining Steel Provided by Contact Welding. T. C. Du Mond. *Materials & Methods,* v. 32, July 1950, p. 55-57.

Process developed by Philips in which the electrode touches the work at all times. It can be used

on mild and low-alloy steels, and offers a number of advantages over conventional arc welding. Comparative costs of welds using contact and conventional E6020 electrodes. Graph shows reduction in nitrogen absorption by weld metal during contact welding. (K1, ST)

434-K. Riveting in Production. E. O. Baumgarten. *Western Machinery and Steel World,* v. 41, July 1950, p. 76-79, 84-85.

Diagrams illustrate good and poor design of riveted joints. (K13)

435-K. Mass Production of All-Welded Deep-Drawn Gas Cylinders. A. I. Nussbaum. *Sheet Metal Industries,* v. 27, July 1950, p. 631-632.

Procedures and equipment of Compressed Gas Cylinders, Inc., Los Angeles, Calif. (K general, G4, ST)

436-K. Assembly Time on Terne Plate Tanks Cut by Forty Per Cent. R. D. Wasserman. *Steel,* v. 127, July 31, 1950, p. 73, 75.

Changes in arc welding technique which effected a saving of 43.85 hr. per 100 lead-covered steel tanks. (K1, T26, CN)

437-K. Metallurgical Materials and Problems When Setting Industrial Diamonds. H. L. Strauss. *Industrial Diamond Review,* new ser., v. 10, June 1950, p. 184-185.

The five methods of setting industrial diamonds are: brazing, induction heating, casting, sintering by conventional methods, and sintering by the hot-press technique. Problems accompanying each method. (K8, E general, H15)

438-K. Code of Practice for the Repair and Reclamation of Grey-Iron Castings by Welding and Allied Methods. *Institute of British Foundrymen,* Paper No. 969, 1950, 8 pages (Advance Copy).

Specification of castings, types of defects that can be repaired, factors limiting repair, available methods, and choice of method. Code for reclamation by welding and by "burning on" (special form of welding). (K general, CI)

439-K. Recommended Practice for the Repair and Reclamation of Non-Ferrous Castings. *Institute of British Foundrymen,* Paper No. 970, 1950, 12 pages (Advance Copy).

Repair by burning, welding, brazing, soldering, annealing, impregnation, calking, plating, and metal spraying. Cu and Al base alloys are given as examples. 48 ref. (K general, J23, L general, Al, Cu)

440-K. Progress at Fawley. *Welding,* v. 18, July 1950, p. 280-289.

Welding equipment and procedures in erection of new British oil refinery. (K1, T29, CN)

441-K. Assessment of Welding. J. Derrix. *Welding,* v. 18, July 1950, p. 306-309.

Conclusion emphasizes the need for producing consistent weld quality. Recommended standards. (K general, S22)

442-K. Some Aspects of Fusion Welding for the Chemical and Food-Producing Industries. F. Jukes. *Transactions of the Institute of Welding,* v. 13, June 1950, p. 79-86.

Classification of the various stainless alloys in use, their weldability, and methods of welding those of the austenitic group. Typical products. (K general, T29, SS)

443-K. Safety in the Practice of Welding. E. Fuchs. *Transactions of the Institute of Welding,* v. 13, June 1950, p. 87-94.

The commoner dangers of welding, both by electric arc and oxy-acetylene, and the protective equipment necessary. (K1, K2, A7)

444-K. Welding in Boilers. S. H. Griffiths. *Transactions of the Institute of Welding,* v. 13, June 1950, p. 95-103.

Savings of material resulting from the substitution of welding for riveting. Techniques employed in pipeline welding, stud welding, and the production of industrial flooring by projection welding. (K general, T26, ST)

445-K. Recommendations for the Metal Arc Welding of Butt Welds in Steel Pipelines for Power Plant. *Welding Research,* v. 4 (bound with *Transactions of the Institute of Welding,* v. 13), June 1950, p. 40r-46r.) (K1, T4, CN)

446-K. The A.C. Argon Arc Process for Welding Aluminium. The Oscillographic Analysis of the Application of a Commercial High Frequency Spark Injector Unit. L. H. Orton, J. C. Needham, and J. H. Cole. *Welding Research,* v. 4 (bound with *Transactions of the Institute of Welding,* v. 13), June 1950, p. 47r-68r.)

Use of electromagnetic and cathode-ray oscillographic recording techniques for the study of certain electrical parameters in the argon-arc process. Nature of the output from a commercial high-frequency spark-oscillator unit is in relation to its application to this process. Superficial appearance of welds on 5% Mg Al alloy and commercially pure Al, made using different electrical conditions. Cathode-ray oscillograms of arc gap voltage show effects of phase of high-frequency input relative to input of the welding transformer. (K, Al)

447-K. Crack Formation in Light-Alloy Welded Structures. (In French.) Marc Hollard. *Revue de l'Aluminium,* v. 27, May 1950, p. 175-182.

See abstract under similar title from *Revue de Métallurgie,* item 398-K, 1950. (K9, Al)

448-K. Electrolytic Brass Plating of Steel Products for Promoting the Adhesion of Rubber. (In Russian.) A. I. Stabrovskii. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, Apr. 1950, p. 370-374.

The quantitative dependence of cohesive force between rubber and brass on the composition of the latter was experimentally investigated. It was found that strongest adhesion is obtained for an electrodeposit containing about 70% Cu and 30% Zn. Thickness variation between 1 and 5 μ has little influence on adhesion. Optimum bath composition and plating conditions were determined. (K11, L17, Cu, ST)

449-K. Electric Welding of Bronze Castings. (In Japanese.) Jiroh Adachi. *Journal of the Casting Institute of Japan,* v. 21, no. 1, 1949. p. 14-29.

Research on welding electrodes and fluxes for repair of bronze castings. It was found that uncoated electrodes are unsatisfactory. Composition of the most suitable flux is 40-50% SiO_2, 20-30% NaOH, and 20-40% $CaCO_3$. Mechanical strength and corrosion resistance of the welds were determined. The best electrode using the above flux was found to contain 84% Cu, 10% Sn, and 6% Zn. (K1, Cu)

450-K. Design Analysis of a Large Weldment. L. G. Hauser. *Engineering Experiment Station News* (Ohio State University), v. 22, June 1950, p. 9-10, 37-38.

As applied to weld-fabricated spider for a water-wheel generator. Cost savings made possible by substitution of this type of construction for cast steel. (K1, T25, CN)

451-K. Some Research Activities Related to Welded Structures. Finn Jonassen. *Engineering Experiment Station News* (Ohio State University), v. 22, June 1950, p. 11-17, 38-42.

A research program which was initiated because of the structural failure of welded ships. This program was started during the war and has been continuing up to the present. 24 ref. (K9, T22, CN)

452-K. Organization and Applications of Maintenance Welding. Lew Gilbert. *Engineering Experiment Station News* (Ohio State University), v. 22, June 1950, p. 18-20, 42-44.

Applications in specific industries. Recommends greater appreciation of potentialities of the various welding processes for repair and maintenance. (K general)

453-K. The Welding of Stainless Steel. George C. Kiefer. *Engineering Experiment Station News* (Ohio State University), v. 22, June 1950, p. 21-24, 44-51.

Includes information on physical and mechanical properties of the welds, response to heat treatment, effect on corrosion resistance, and use of dissimilar welding rods. (K general, SS)

454-K. Application of Contact Welding. A. B. Tesmen. *Engineering Experiment Station News* (Ohio State University), v. 22, June 1950, p. 25-26, 51-54.

Process and equipment developed by Philips in Holland. The electrode is claimed to simplify welding technique, increase welding speed, and improve quality of the welds. Includes comparative cost analysis. (K1)

455-K. Research in Welding Engineering. Robert J. Krieger. *Engineering Experiment Station News* (Ohio State University), v. 22, June 1950, p. 27-28, 54-56.

Outlines some of the more important welding research problems which exist today. Some of these problems have been under almost continuous investigation for many years, others have been studied only intermittently, while still others have just recently been uncovered. (K9)

456-K. Metal Adhesives for Bonding Aircraft Assemblies. *Automotive Industries,* v. 103, Aug. 1, 1950, p. 38-40, 82, 84.

Increasing use of "Metlbond", developed by Convair from two other adhesives, used in separate layers. To date, the process has been used primarily on clad Al alloys and on Mg alloys. It is also applicable to ferrous and to additional nonferrous metals, but processing methods have not been fully investigated. (K12, Al, Mg)

457-K. Commutator Soldering by High Frequency Heating. Loren Jones. *Railway Mechanical and Electrical Engineer,* v. 124, Aug. 1950, p. 452-453, 460.

Simple soldering procedure. (K7, T1, Cu)

458-K. Torch Brazing by Reciprocal Combustion. C. J. Milner. *Journal of Scientific Instruments,* v. 27, July 1950, p. 207.

Technique suitable for brazing of vacuum-tube parts, etc. The phenomenon of reciprocal combustion refers to the apparent burning of a jet of air or oxygen when it issues into a space containing a combustible gas. In this case the work is contained in a chamber filled with hydrogen, while the jet consists of oxygen. (K8)

459-K. Bad and Good Resistance Welding. R. T. Gillette *American Machinist,* v. 94, Aug. 7, 1950, p. 125, 127.

Typical cases. (K3)

460-K. Forging Dies Repaired by Arc Welding. Frank Macho. *American Machinist,* v. 94, Aug. 7, 1950, p. 132-133.

Procedures at Harnischfeger Corp. Low-hydrogen electrodes are used. (K1, T5, TS)

461-K. Joining Hard-To-Weld Metals at High Production Rates. S. D. Baumer. *Machinery* (American), v. 56, Aug. 1950, p. 158-164.

How parts made of stainless steel, aluminum, and Al bronze are rapidly welded in all positions by means of the "Aircomatic" process. Typical applications of this inert-gas-shielded metal-arc welding process. (K1, ST, Al, Cu)

462-K. Perfection Welding. *Industry & Welding,* v. 23, Aug. 1950, p. 20-21, 47.

Various resistance-welding equipment and procedures at Perfection Stove Co., Cleveland. Metals are mild and stainless steels. (K3, T10, ST)

463-K. Know-How Pays Off. *Industry & Welding,* v. 23, Aug. 1950, p. 24-25, 66.

Weld fabrication of steel at Eisler Engineering Co., Newark, N. J. (K general, A5, ST)

464-K. Welding Crews Hit the Desert. James Joseph. *Industry & Welding,* v. 23, Aug. 1950, p. 26-27, 30, 61.

Pipeline electric welding equipment and procedures on Texas-California gas line. (K 1, T29, CN)

465-K. Special Designed Turning Rolls Pay Off as Texas Auto Tunnel Is Fabricated by Turning Toward Welding. *Industry & Welding,* v. 23, Aug. 1950, p. 31-32, 45.

Sections of tunnel wall are made of steel and are 20 ft. in diam. Electric welding of the circumferential seams takes place automatically as the sections are slowly rotated by means of turning rolls on which they rest. (K1, T26, CN)

466-K. Spot Welding Speeds Production. *Industry & Welding,* v. 23, Aug. 1950, p. 34-35, 51.

Use in manufacture of all-steel station-wagon bodies by Fisher Body's Euclid, Ohio, plant. (K3, T21, CN)

467-K. Infrared Weld Preheater. *Industry & Welding,* v. 23, Aug. 1950, p. 48.

Equipment developed for preheating high-tensile steels, especially during cold weather, to prevent crack development in the weld zones. Advantages over conventional preheating methods. (K general, ST)

468-K. Precision Rings Hot Pressure Welded. Gilbert C. Close. *Steel,* v. 127, Aug. 14, 1950, p. 88-89, 111-112.

How support rings for aircraft jet-engine blast tubes, high-pressure metal gaskets, and close-tolerance parts are being formed with success by a direct descendant of the blacksmith's ancient art. Materials used include alloy and stainless steels. (K3, AY, SS)

469-K. Welded Steel Construction Lowers Lift Truck Cost. *Product Engineering,* v. 21, Aug. 1950, p. 106-107. (K1, T21, ST)

470-K. Seven Common Troubles Found in Welding Stainless and Other Alloy Steels. James E. Norcross. *Welding Engineer,* v. 35, Aug. 1950, p. 26-29.

Porosity, micro-cracks, incomplete penetration, convex fillets, undercutting, incomplete slag removal, and "fingernailing", and their causes and remedies. (K general, SS, AY)

471-K. Welding, Brazing, Soldering Beryllium Copper. III. (Concluded.) John T. Richards. *Welding Engineer,* v. 35, Aug. 1950, p. 35-37.

Welding of beryllium copper by carbon-arc, metal-arc, and inert-arc processes. (K1, Cu)

472-K. Three-Phase Welding. J. L. Solomon. *Welding Engineer,* v. 35, Aug. 1950, p. 38-41.

Electrical advantages of resistance welding with the three-phase system which includes lowered demand, power factor above 85%, reduced line currents, uniform heating effects on all three lines and on all three phases. Welding and metallurgical advantages are reduced expulsion of metal, greater tip life, and less electrode pick-up when welding Al and Mg. (K3)

473-K. New Job for Stud Welding. *Welding Engineer,* v. 35, Aug. 1950, p. 42.

Stainless steel studs of special design are welded to the interior of catalyst regenerators at the Toledo refinery of Sun Oil Co. They are used to support thick insulation and refractory tiles which are used as lining. (K1, SS)

474-K. Silver-Brazing Alloys and Trade Names. *Welding Engineer,* v. 35, Aug. 1950, p. 49.

Comparable trade names used by three firms; compositions; melting and flow points, and specification sources and numbers, for 37 different alloys. (K8, SG-f)

475-K. Stud Welding. *Canadian Metals,* v. 13, July 1950, p. 36.

Use for installing corrugated aluminum roofing and siding at Aluminum Co. of America's new Point Comfort Works. (K1, T26, Al)

476-K. Modern Cable Sheathing Practice; G.E.C. Cold Pressure Welding. *Wire Industry,* v. 17, July 1950, p. 600, 603.

Equipment and procedures for production of Al-sheathed cable, consisting of four stages: flange forming; preparation of flange surfaces; introduction of cable and formation of tube; and pressure welding and removal of flanges. (K5, F26, Al)

477-K. Zinc-Rich Solder for Aluminium; Some Preliminary Tests on Various Compositions. C. W. Roberts. *Metallurgia,* v. 42, July 1950, p. 55-58.

Results of a series of tests on an alloy containing 95% Zn, 5% Al, and with or without 1.01% Ti, indicate that such an alloy is, in several important respects, superior to a number of other alloys recommended for soldering Al. (K7, Al, Zn, SG-f)

478-K. Welding Sheet-Metal Components for Jet Propulsion Units. *Machinery* (London), v. 77, July 20, 1950, p. 79-82.

Equipment and procedures at Pratt & Whitney Aircraft Div., East Hartford, Conn. Metals are chiefly 18-8 stainless and the heat resistant Cr-Ni-Fe alloy known as Nimonic 75. Resistance welding is the principal joining method. (K3, T25, SS, SG-h)

479-K. Welding Carbon Steels and Carbon Steel Castings. J. Lomas. *Machinery Lloyd* (Overseas Edition), v. 22, July 22, 1950, p. 97-99, 101, 103.

Procedures for the various types, grouped according to carbon content. (K general, CN, CI)

480-K. Research on the Criteria of Weldability of Steels. (In French.) *Revue de la Soudure: Lastijdschrift,* v. 6, no. 2, 1950, p. 59-71.

Results of study by a Belgian-Dutch commission concerning test methods (in particular, size and shape of notched test specimens) for determination of applicability of steel for welded structures at low temperatures (−80 to 20° C). Method of comparative testing. (K9, CN)

481-K. Study of the Fatigue Resistance of Welded Structures. (In French.) (To be continued.) W. Soete and R. Van Crombrugge. *Revue de la Soudure; Lastijdschrift,* v. 6, no. 2, 1950, p. 72-82.

Studies in a plain-carbon steel. Method of investigation, conditions of welding, apparatus used, and different types of test specimens used. (K3, Q7, CN)

482-K. Shrinkage and Shrinkage Phenomena Resulting From Arc Welding. (In French.) H. E. Jaeger. *Revue de la Soudure; Lastijdschrift,* v. 6, no. 2, 1950, p. 83-95.

Influence of certain factors, such as type of electrodes used, rate of welding, rate of cooling, etc., on degree of shrinkage (longitudinal and transverse) of steel. Method of investigation, including apparatus and test specimens. (K1, CN)

483-K. The Bonding of Metals With Sodium-Phenol Resins. (In German.) Joh. F. Ehlers. *Kunststoffe,* v. 40, May 1950, p. 151-157.

Extensive tensile strength measurements of metals joined with this adhesive were made in order to study the effects of external conditions on joint strengths. Effectiveness of this adhesive is explained by formation of compounds from the oxides or hydroxides of the metals and the chain molecules of the "resins". (K12)

484-K. Spot Welding of Thick Steel Parts With Low-Frequency Current. (In Russian.) A. S. Gel'man and E. S. Slepak. *Avtogennoe Delo* (Welding), v. 21, Apr. 1950, p. 1-6.

An automatic three-phase low-frequency spot welding machine developed especially for welding structural steel parts of thicknesses up to 12 mm. Electrical circuit is diagrammed. Mechanical characteristics of welds obtained in low-carbon, low-alloy structural steels. (K3, CN)

485-K. Automatic Butt Welding of Sheets, One of Which Is Beveled. (In Russian.) M. R. Shraerman. *Avtogennoe Delo* (Welding), v. 21, Apr. 1950, p. 6-10.

Laboratory investigation demonstrated that superior weld-seam characteristics are obtained for automatic butt welding under flux of steel sheets 14-30 mm. thick when the bevel of the edges to be joined together is unsymmetrical. This technique was found to save 17-40% of the usual time. (K1, ST)

486-K. Alloying Calculations for Deposited Metal in Electric Arc Welding. (In Russian.) P. S. Elistratov. *Avtogennoe Delo* (Welding), v. 21, Apr. 1950, p. 10-12.

A nomogram for simplification of necessary calculations; its application. Influence of certain fundamental factors, such as acidity or basicity of coating, percentage composition of rod or coating, polarity, arc length, etc., on value of the coefficient of exchange is studied. (K1)

487-K. Natural Magnetic Field of the Welding Arc. (In Russian.) I. D. Artanonov. *Avtogennoe Delo* (Welding), v. 21, Apr. 1950, p. 13-15.

Mathematical analysis, showing how to perform practical calculations. How the results may be applied to improvement of welding practice. (K1)

488-K. New Device for Control of Conditions During Contact Welding. (In Russian.) D. S. Balkovets. *Avtogennoe Delo* (Welding), v. 21, Apr. 1950, p. 24-27.

Cathode-ray oscillograph applicable for checking various welding parameters. An ammeter is especially designed for "dynamic" measurement of secondary current. (K1)

489-K. Modern Pipe Welding Practices. Part 1. F. C. Fantz. *Petroleum Engineer,* v. 22, July 1950, p. C7-C10.

Advantages of welded structures, types of pipe connections, and types of flanged joints. (To be continued.) (K general, ST)

490-K. Welding Magnesium. Part 1. Paul Klain. *Industry & Welding,* v. 23, Aug. 1950, p. 22-23, 46.

First of a series on recommended procedures. Weldability, choice of

materials, preparation, and surface cleaning. (To be continued.) (K general, Mg)

491-K. Want To Double Your Brazing Operation? *Steel,* v. 127, Aug. 21, 1950, p. 102.

Silver-alloy brazing setup responsible for reducing by one-third, cost of producing 500,000 steel roll backs for door locks. By adding a second heating station and another operator, it can be made to double production and cut costs still furtner. (K8, ST)

492-K. How To Weld Corrosion Resistant Materials. W. G. Scherer. *Materials & Methods,* v. 32, Aug. 1950, p. 60-61.

Recommended procedures for Ni and Ni-Clad steels, stainless steels, Ni alloys, and Cu alloys. Welds that are no more susceptible to corrosion than unwelded areas can be made in most corrosion resistant materials. (K general, Ni, Cu, SS, SG-g)

493-K. Welding Patent Classification in the A. F. Davis Welding Library. Robert S. Green. *Engineering Experiment Station, Ohio State University,* Bulletin No. 140, Jan. 1950, 74 pages.

Classification system. Illustrates punch card used. (K general, U8)

494-K. (Book) **Resistance Welding: Designing, Tooling and Applications.** Wallace A. Stanley. 329 pages. 1950. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $7.50.

Spot welding, projection welding, seam welding, and flash-butt welding. Basic information on resistance welding, the application of basic process details in designing welded parts, and use of this background and design data in tooling and production. (K3)

L

CLEANING, COATING AND FINISHING

476-L. New Materials and Techniques Covered at AES Convention. *Iron Age,* v. 166, July 20, 1950, p. 97-100.

Summary of proceedings of 37th Annual AES Convention and 4th International Electrodeposition Conference, Boston. (L17)

477-L. Tin Plate Cleaning and Annealing Cycle May Be Cut to Less Than Two Days. Alfred E. Kadell. *Steel,* v. 127, July 24, 1950, p. 72.

Continuous method which will permit tremendous reduction of in-process inventory and closer control of physical properties and surface conditions of the steel. (L12, J23, ST)

478-L. The Production of Home Freezers. Arthur Q. Smith. *Industrial Gas,* v. 29, July 1950, p. 3-5, 24.

Sheet forming and enamel finishing using gas-fired equipment. (L27, G3, CN)

479-L. Tougher Coatings for a Tough Job. J. E. Kastrop. *Bakelite Review,* v. 22, July 1950, p. 12-15.

Condensed from "Plastics Combat Well-Head Corrosion", *World Oil,* item 256-L, 1950. (L26, R4)

480-L. Production Painting of Steel Drums. Seymour Schlein. *Industrial Finishing,* v. 26, July 1950, p. 24-26, 28, 30, 32.

Procedures and equipment at Cleveland Steel Barrel Co. (L26, ST)

481-L. Blast Cleaning Metal Parts. *Industrial Finishing,* v. 26, July 1950, p. 34-36.

Procedures employed by Servel, Inc., Evansville, Ind. Steel coils are prepared for application of Al coatings. (L10, ST)

482-L. Health Hazards in Metal Degreasing. Paul W. McDaniel. *Metal Progress,* v. 58, July 1950, p. 77-78, 102, 104, 106, 108-109, 111.

As applied to alkaline, acid, and solvent cleaning. (L12, A7)

483-L. Installation & Operation of a High Speed Nickel Solution for Repetition Plating. C. W. J. Morley. *Electroplating and Metal Finishing,* v. 3, July 1950, p. 400-404.

Solution for repetition plating of semi-bright Ni. Details of proper temperatures, steam heating, agitation, filtration, removal of impurities, voltages, anodes, and technical control. (L17, Ni)

484-L. Electrolytic Polishing in Cyanide Solutions. *Electroplating and Metal Finishing,* v. 3, July 1950, p. 415-416.

Conditions for satisfactory polishing of Ag, Cu, Cd indicated in a new patent specification of Arthur D. Little, Inc. (L13, Ag, Cu, Cd)

485-L. Bright Deposits From Sulphate Copper Electrolytes. *Electroplating and Metal Finishing,* v. 3, July 1950, p. 417-418.

Recently published British patent granted to General Motors Corp. It is claimed that brilliant Cu deposits. (L17, Cu)

486-L. Gold Plating Nickel Dental Clips. *Electroplating and Metal Finishing,* v. 3, July 1950, p. 427.

Specifications of recent French patent. (L17, Ni, Au)

487-L. Salt Baths Perform Variety of Cleaning Jobs on Most Metals. John B. Campbell. *Materials & Methods,* v. 32, July 1950, p. 60-64.

Advantages, limitations, applications, and some case histories of non-electrolytic salt baths. (L12)

488-L. Wrinkle Finishes Provide Attractive Durable Coatings. W. A. Waldie. *Materials & Methods,* v. 32, July 1950, p. 65-67.

Various types, their uses, and methods of application. (L26)

489-L. Cyclic Phenomena Observed in Electropolishing of Silver. Howard T. Frances and William H. Colner. *Journal of the Electrochemical Society,* v. 97, Aug. 1950, p. 237-240.

A study was made of the anodic electropolishing of silver in a standard cyanide plating bath. The current flowing in such a cell, under certain circumstances, shows repeating fluctuations. Frequency of this cyclic effect is due to the anodic portion of the cell, and is markedly dependent on the stability of the d.c. source used. Best polishing is obtained at the highest frequencies. (L13, Ag)

490-L. Electrolytic Hexagonal Nickel. Ling Yang. *Journal of the Electrochemical Society,* v. 97, Aug. 1950, p. 241-244.

Conditions governing formation of the above in baths containing $NiCl_2$, $NiSO_4$, and H_3BO_3. A mixed structure of face-centered cubic and hexagonal close-packed forms was always present in deposits made from baths containing a relatively large amount of $NiCl_2;6H_2O$ at higher current densities and lower bath temperatures. Deposits with a mixed structure were found to contain more occluded hydrogen than those with a simple face-centered-cubic structure. Possible connection between higher hydrogen content and presence of the mixed structure under certain bath conditions. 13 ref. (L17, Ni)

491-L. Some Aspects of Adhesion. E. S. Beck. *Organic Finishing,* v. 11, July 1950, p. 8-11, 16.

Cohesion vs. adhesion; types of adhesion; priming metal surfaces; and finishing factors affecting adhesion. (L general)

492-L. Production Finishing of Automotive Parts. *Organic Finishing,* v. 11, July 1950, p. 12-13.

Refers to enamel and lacquer coatings. (L26, T21)

493-L. Plating Range Tests Improve Plating Baths. J. B. Mohler. *Iron Age,* v. 166, July 27, 1950, p. 63-67.

How optimum plating conditions under continuous operation can be achieved by periodic plating-range tests, under conditions in which chemical analysis alone is insufficient. Details of procedures and equipment. (L17)

494-L. A Survey of the Application and Performance of Temporary Rust Preventives. G. T. Dunkley. *Sheet Metal Industries,* v. 27, July 1950, p. 599-604, 606.

Performance of various types, mainly in West Africa and New Guinea. (L14, L26, Fe)

495-L. Some Aspects of Corrosion Prevention in Practice. W. Montgomery. *Sheet Metal Industries,* v. 27, July 1950, p. 643-653.

General principles: the "Barffing" process (formation of protective oxide coating on iron and steel by reaction with steam at red heat); vitreous enameling, including various types of defects; testing permeability of enamels; and galvanizing. (L14, L16, L27, Fe)

496-L. High Temperature Refractories Discussed at Electrochemical Society Meeting. *Steel,* v. 127, July 31, 1950, p. 78, 81-82.

Recent developments in refractories that will withstand 4000° F. and higher; how Cr improves oxidation resistance of TiC; protective coatings for Mo; vapor deposition of refractory coatings; improved Pd-plating bath; new heat resistant protective coatings; and corrosion of composite plated coatings. (L27, B19)

497-L. Plastics Meet the Acid Test. Raymond B. Seymour. *Modern Plastics,* v. 27, Aug. 1950, p. 91-92, 94, 96, 98, 148, 150.

Presents extensive review of literature on resistance to attack by various chemicals of different types of plastics used as protective coatings, linings, corrosion resistant cements, and other materials. 189 ref. (L26)

498-L. World's Fastest Tinplating. J. A. Jones and W. R. Huey. *Du Pont Magazine,* v. 44, Aug.-Sept. 1950, p. 14-15.

Procedures and equipment of Weirton Steel Co. Speeds of 2000 ft. per min. are possible for the electrolytic plating of tin by use of a halogen solution developed by Du Pont. (L17, CN, Sn)

499-L. Some Aspects of Flame Spraying by the Powder Process. James N. Blake. *Engineering & Chemical Digest,* v. 2, May 1950, p. 158-163. Condensed from *Transactions of the Institution of Chemical Engineers in Charge,* v. 54, no. 8.

The Schoop powder pistol and associated equipment; and its application to deposition of Zn, Al, Pb, Sn, Cu, bronze, plastics, synthetic rubbers, sulfur and wax. Compares method with others for depositing zinc. (L23, Zn, Al, Pb, Sn, Cu)

500-L. New Developments in Porcelain Enameling. Burnham W. King. *Finish,* v. 7, Aug. 1950, p. 32-35.

Includes the "pros and cons" of low-temperature enamels and the outlook for color. (L27)

501-L. Drums Formed and Welded After Litnograpning. *Sheet Metal Worker*, v. 41, July 1950, p. 52.

Process in use by Rheem Mfg. Co. (L26, CN)

502-L. A Rapid Method of Immersion Silvering; Pre-Treatment With Stannous Chloride. *Chemical Age*, v. 63, July 1, 1950, p. 14, 17.

Pretreatment with $SnCl_2$ resulted in great improvement of the silvering process using a 1% ammoniacal solution with 10-15% pyridine and addition of hydrazine sulfate to reduce the silver salt. In contrast to the usual process, little silver was precipitated on the walls of the vessel. A surface-active agent was required when very pure pyridine was used, hence it was discovered that other bases—NH_3 or cyclohexylamine—could be used in the presence of the surface-active agent. (L16, Ag)

503-L. Influence of Various Additions to Hard Chromium Plating Baths on Character of the Chromium Deposit. (In Czech.) J. Doskar. *Hutnicke Listy*, v. 5, May 1950, p. 197-201.

Experimental results obtained with various additions. Microstructures of the deposits and their characteristics. (L17, Cr)

504-L. Anodic Oxidation of Metals With Different Surface Textures. (In Russian.) G. S. Vozdvizhenskii, A. Sh. Valeev, and T. N. Grechukhina. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 11, 1950, p. 311-313.

Influence of the surface condition of 99.5% Al following different surface treatments (abrasive-paper polishing, mechanical polishing, or electropolishing) on microstructure after anodic oxidation. Differences in porosity between sections parallel and perpendicular to the direction of working. (L19, Al)

505-L. Determination of Quantity of Heat Released by the Current Flow in Electrolytic Baths. (In Russian.) L. I. Antropov. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, Apr. 1950, p. 375-379.

Different methods of calculating the Lentz-Joule heat of electrolytic baths. Indicates sources of error inherent in usual approximate methods and attempts to formulate a more accurate method. (L17)

506-L. Electrodeposition of High-Tin Bronzes. (In Russian.) N. P. Fedot'ev, N. M. Vyacheslavov, and E. I. Orlova. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, Apr. 1950, p. 380-384.

Experimental investigation indicates that speculum plating may be obtained by using a Cu stannate bath of the following composition: Sn, 45-60; Cu, 10-15; NaOH, 25-30; and KCN, 10-15 g. per. l. Optimum electrical conditions were also determined. (L17, Cu)

507-L. Protective and Decorative Film on Iron and Steel Produced by Means of Oxalate Containing Small Amount of Phosphate. (In Japanese.) Hikozo Endo and Ichiro Nihei. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 27-28.

Research was carried out in order to utilize the aqueous solution and precipitation of hydrophosphate (containing Zn, Mn and Fe), which decreased the activity of film formation. It was found that the above precipitate can be re-used as a rust preventative by addition of a hot solution of 2-3% oxalic acid. The film thus formed can be used as a base for paint or other coatings. (L14, Fe, ST)

508-L. Evaluation of Organic Coatings by Electrographic Printing. Max Kronstein, Marion M. Ward, and Robert Roper. *Industrial and Engineering Chemistry*, v. 42, Aug. 1950, p. 1568-1572.

Application of the electrographic printing method for the detection of permeability and under-film spreading of moisture of organic coatings gives new means for the rapid evaluation of these coatings under many conditions and in conjunction with many of the usual test methods. The method has been used successfully over a period of nearly 3 years in the development and evaluation of new coatings and modification of commercial coatings. (L26, R11)

509-L. Corrosion in a Large Invert Sugar Tank. H. W. Foelsch. *Corrosion* (News Section), v. 6, Aug. 1950, p. 1.

Illustrations show superiority of phenolic-resin coating over a pigmented phenolic paint for interior surfaces of sugar tank. Lining procedure. (L26, ST)

510-L. Recommended Practices for Surface Preparation of Steel: TP-6G—Surface Preparation for Organic Coatings. *Corrosion* (Technical Section) v. 6, Aug. 1950, p. 276-282.

First Interim Report of NACE Technical Practices Committee. (L26, ST)

511-L. Plating Zinc Base Die Castings. *Die Castings*, v. 8, Aug. 1950, p. 37-39, 41-42, 63.

Surveys recent literature, including chemical cleaning before plating. (L17, Zn)

512-L. Bonding Aluminum to Ferrous Alloys. M. V. Little. *Machinery* (American), v. 56, Aug. 1950, p. 173-177.

"Al-Fin" process in which pure Al and its alloys are molecularly bonded to iron and steel. Preselected physical properties of both metals are combined in such bi-metallic components. The process consists essentially of casting molten Al alloy around a specially prepared ferrous surface. Structure of bonds is illustrated by photomicrographs. (L22, Al, ST)

513-L. Electroforming. *Product Engineering*, v. 21, Aug. 1950, p. 145-147.

Recent improvements which have put this process on a mass-production basis. Tubular and cup-shaped parts having special contours otherwise impractical to form can now be produced in quantity. Metallic coating of plastics, forming of precision dies, joining of small components, and production of limited quantities of parts for product development are other applications. (L18)

514-L. Wetting Properties of Some Enamel Glasses and Relation to Impact Resistance. W. J. Knapp, C. C. Shah, and T. J. Planje. *Journal of the American Ceramic Society*, v. 33, Aug. 1, 1950, p. 258-262.

Wetting properties on commercially pure enameling iron were determined and compared with correlated impact-resistance test results. Rate of change of wetting characteristics with temperature seemed to influence impact resistance of the enameled metal. 31 ref. (L27, P10, Fe)

515-L. The Role of Spray Pickling in Porcelain Enameling. Jason W. Zander. *Better Enameling*, v. 21, Aug. 1950, p. 6-7, 31.

The process, its advantages and disadvantages. (L12, L27, CN)

516-L. Silver Alloy Cladding Cuts Brazing Costs. *Steel*, v. 127, Aug. 7, 1950, p. 111.

New development applicable to nonferrous products incorporating hollow handles, hidden joints, seamed tubes and irregularly shaped parts, springs, studs. Such materials as copper, most types of brass, nickel silver, jewelers' bronze, beryllium copper, cupro-nickel, nickel, monel, may be clad on one or both sides by the process, known as Braze-Clad. (L22, K8, Ag)

517-G. How To Stop That Waste In Machining. E. J. Tangerman. *American Machinist*, v. 94, Aug. 7, 1950, p. 99-114.

Special report consists of two articles: "Are We Riding the Brake in Machining Speeds" and "Machining Costs a Billion a Year Too Much". The first emphasizes the possibility of using greater speeds and the second the potentialities of postwar equipment. The "billion dollar" figure is based on a detailed survey of the number of units at least 10 years old in design and the per cent increase in productivity of 1950 machine tools over those of 1940. (G17)

518-L. Recent Developments in Metallizing. *Machine and Tool Blue Book*, v. 46, Sept. 1950, p. 71-76.

Three important advances in this process are: Discovery of an alloy which bonds itself to the base material; a metallizing unit which operates on a smaller volume of air; and introduction of a glass flow meter. The alloy undercoat is one containing a high percentage of Mo. It can be sprayed on all common steels, stainless steels up to 12% Cr, monel, Ni, Cr-Ni alloys, cast iron and steel, most Al alloys and Mg. It also bonds fairly well to other materials including glass and ceramics. (L23)

519-L. Salt Bath Cleaning of Gray Iron Castings. Robert H. Herrmann. *Foundry*, v. 78, Aug. 1950, p. 90-91, 204-205.

Continuous process used by Chevrolet-Cleveland Div., General Motors Corp. The castings are normalized and cleaned in a continuous, automatic operation by conveying them through a furnace and a series of baths, including molten caustic, acid, water, and oil. (L12, J2, CI)

520-L. Titanium Parlay Wins for Westinghouse. *Ceramic Industry*, v. 55, Aug. 1950, p. 50-54, 57, 94.

Experiments on range platforms proved worth of one-coat processes, and were followed by adoption of the method for standard production. Inert steel and thin coatings combined to reduce production and shipping costs on electric ranges. Procedures and equipment. (L27, ST)

521-L. The Strength and Ductility of Electro-Deposited Metals. II. Some Data on Acid-Copper Deposits. Thomas A. Prater and Harold J. Read. *Plating*, v. 37, Aug. 1950, p. 830-834, 850.

Data on tensile strength and ductility of commercially produced thin electrolytic copper sheet. Satisfactory reproducibility of the bulge test is indicated by the fact that the stress-strain data fall on smooth curves which are very similar to the flow curves obtained in the conventional tension test. Best agreement was obtained with the thinner deposits. No thickness effect was observed in the range investigated, 0.66-3.6 mils. Anisotropy did not affect seriously the validity of the method. (L17, Q23, Cu)

522-L. Determination of Free Cyanide and Ammonia in Brass and Bronze Plating Baths. Part II. (Continued.) **Experimental Evaluation of Present Methods and Recommended Procedures for Free Cyanide Determination.** Samuel Heiman. *Plating*, v. 37, Aug. 1950, p. 835-838, 855. (L17, S11, Cu)

523-L. Alkaline Metal Cleaning Compound Specifications. A. Mankowich. *Plating*, v. 37, Aug. 1950, p. 843-844.

Important advantages result from use of the "laboratory-performance" type of specifications. (L12, S22)

524-L. Current and Metal Distribution in Electrodeposition. I. Critical Review of the Literature. John Kronsbein. *Plating,* v. 37, Aug. 1950, p. 851-854.

Historical review shows that, while considerable work has been done and fundamentally similar problems exist in many apparently unrelated fields, existing mathematics is not capable of solving any but the most simple problems and those usually only by disregarding polarization of the electrodes. The chief task of the project, therefore, is to develop experimentally desirable practical information which is directly applicable to commercial electroplating baths. This work is proceeding with studies of fillets and their radii on both inside and outside corners and their effect on metal distribution with respect to flat surfaces. 58 ref. (L17)

525-L. Modern Masking Materials and Methods for Fabrication and Spray Finishing. Part I. Pressure-Sensitive Tapes, Die-Cut Stencils, Papers—Development and Characteristics. Arthur P. Schulze. *Products Finishing,* v. 14, Aug. 1950, p. 20-32.

Use of masking materials, techniques of application and removal. 13 ref. (L26)

526-L. Alloys of Phosphorus With Cobalt or Nickel. *Products Finishing,* v. 14, Aug. 1950, p. 32, 34, 36.

See abstract of "Electrodeposition of Alloys of Phosphorus and Nickel or Cobalt", Abner Brenner, Dwight E. Couch, and Eugenia Kellogg Williams, *Plating,* item 64-L, 1950. (L17, Co, Ni)

527-L. Galvanizing by the Sendzimir Process. K. Oganowski. *Products Finishing,* v. 14, Aug. 1950, p. 42-44, 46, 48, 50, 52, 54, 58, 60, 62, 64, 66.

See abstract of "Armco Takes Wraps Off Sendzimir Galvanizing Process", *Iron Age,* 391-L, 1950. (L16, Zn, ST)

528-L. Chemical Brightening of Aluminum. *Products Finishing,* v. 14, Aug. 1950, p. 84, 86, 88, 90. Condensed from paper by Walter R. Meyer and Steven H. Brown.

Results of research on chemical polishing of aluminum in different acid mixtures based on studies carried out in Enthone Laboratories. (L12, Al)

529-L. Drums for Petroleum Coke. Fred M. Burt. *Welding Engineer,* v. 35, Aug. 1950, p. 17-19.

Procedures and equipment for production of huge stainless steel lined vessels 80 ft. long and 70 ft. in diam. The liner is spot welded to the C-Mo steel body while the plates are flat. The assembly is then rolled to the proper curvature. Six sections each consisting of two semicircles are welded together to form the cylinder. Bottom and top sections must then be fabricated and attached by electric welding. Stress relieving is done a section at a time in a large portable furnace. (L22, J1, T26, SS, AY)

530-L. Steel Protection by Chromium Diffusion. P. Galmiche. *Engineers' Digest,* v. 11, July 1950, p. 250. Translated and condensed.

Previously abstracted from "A New Method of Thermal Chromizing and Formation of Mixed Alloys as a Result of Diffusion". *Revue de Metallurgie.* See item 381-L, 1950. (L15, CN, Cr)

531-L. Corrosion. Rogers Clark. *Canadian Metals,* v. 13, July 1950, p. 38, 40.

The over-all cost of corrosion. Use of pre-oxidized fish oil (with pigment) as a rust-inhibitive coating. (L26)

532-L. Metal Cleaning; Methods of Surface Preparation Prior to Finishing. M. Reeves. *Metal Industry,* v. 77, July 28, 1950, p. 54-55.

A survey. (L general)

533-L. Use of Radioactive Tracers in the Study of Transition and Critical Temperatures of Molecular Jets on Surfaces. (In French.) Gustave Ribaud and Marcel Devienne. *Comptes Rendus* (France), v. 230, May 22, 1950, p. 1811-1812.

"Molecular jets" are obtained by diffusion under vacuum of heated materials through orifices of diameter smaller than the mean free path of the molecules under the conditions employed. The jets are condensed on glass or metal plates outside the orifice. By use of radioactive isotopes, much smaller quantities of material can be detected. The method can also be used to detect reflection of molecules from one surface to another one. Since part of the molecules of Sb are reflected from a glass plate at 73° C., this temperature must be between the transition and critical temperatures of condensation for the particular case. The method may also be used for study of the influence of nature of surfaces on reflection and deposition of molecules. (L25, S19)

534-L. Concerning the Chemical Nature of Electropolished Metallic Surfaces and Their Practical Importance. (In French.) Pierre A. Jacquet and Marcel Jean. *Comptes Rendus* (France,) v. 230, May 22, 1950, p. 1862-1864.

Experiments showed that surfaces of Cu, Zn, and Mg electropolished in a solution of phosphoric acid may retain traces of phosphorus compounds. However Fe, polished in a phosphoro-chromic medium, does not retain compounds rich in P or Cr, but probably again becomes covered with iron oxide. Results are discussed from the point of view of certain properties characteristic of electropolished metals. (L13, Cu, Zn, Mg, Fe)

535-L. Present Status of Industrial Electropolishing. (In German.) P. A. Jacquet. *Metalloberfläche,* v. 4, sec. A, June 1950, p. 81-92.

A general survey. (L13)

536-L. Electropolishing of Carbon and Alloy Steels and Its Commercial Application. (In German.) W. Eilender, R. Mintrop, and R. Au. *Metalloberfläche,* v. 2, sec. B, June 1950, p. 81-88.

Principles of electropolishing. Reviews the literature. Conditions for the successful polishing of steels are enumerated; an automatic apparatus for polishing small articles; special polishing jobs and conditions. 39 ref. (L13, ST)

537-L. Electropolishing in the Fine Arts. (In German.) P. Schilling. *Metalloberfläche,* v. 2, sec. B, June 1950, p. 88-91.

As applied to Al and steel. (L13, Al, ST)

538-L. Electropolishing for Production of Exact Geometrical Shapes in Machine Parts and the Like. (In German.) *Metalloberfläche,* v. 2, sec. B, June 1950, p. 92.

Specific suggestions for avoiding or minimizing nonuniform polishing. (L13)

539-L. Research on the Density of Acid Resistant Enamels. (In German.) Karl Frick. *Metalloberfläche,* v. 4, sec. A, July 1950, p. 97-101.

Studies on the permeability of enamel to gases showed that gases and liquids can move in a layer of enamel parallel to the surface of the iron. In the enamel types that are applied to cast iron over a fritted base, the undercoating of enamel is porous and thus permeable to gases and liquids; but is dense when the enamel undercoating is fused directly to the cast iron or steel. Disadvantages of enamels with a fritted base. (L27, CI, ST)

540-L. The Preparation of Sheet Metal Surfaces for Lacquering. (In German.) *Metalloberfläche,* v. 4, sec. A, July 1950, p. 108-110.

Different methods. (L26)

541-L. A Suggestion for Controlling Hard-Chromium Baths. (In German.) Günter Dehmel. *Metalloberfläche,* v. 2, sec. B, July 1950, p. 105-106.

Suggests that the bath be sampled after the number of ampere hours of electricity consumed is equivalent to the deposition of about 1% Cr. Electrical conductivity and distributing power also indicate the condition of the bath. (L17, Cr)

542-L. Influence of Surface-Active Substances on Cathodic Deposition of Cadmium. (In Russian.) V. Sotnikova and M. Loshkarev. *Zhurnal Obshchei Khimii* (Journal of General Chemistry), v. 20(82), May 1950, p. 755-761.

Cathodic polarization during deposition of Cd from pure solutions of $CdSO_4$ with additions of phenols, diphenylamine, and gelatine was studied. Influence of such organic additions was investigated and the accelerating action of some of them is explained. 13 ref. (L21, Cd)

543-L. Dependence of Smoothness of Machined Surfaces on Speed of the Polishing Wheel. (In Russian.) D. M. Tarasenko. *Stanki i Instrument,* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 19.

Results of experimental investigation. Material studied is not indicated. (L10)

544-L. Surface Microgeometry Resulting From Internal Polishing of Hardened Steel. (In Russian.) A. B. Kondrat'ev. *Stanki i Instrument,* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 20.

Investigated on a roller-bearing ring of 110-mm. i.d. and 53-mm. width. The influence of longitudinal polishing-wheel travel, of speed of rotation of the part being polished, of depth of cut, and of dullness of the polishing wheel. (L10)

545-L. Structure and Kinetics of Oxidation of Cathodic Copper. (In Russian.) N. A. Marchenko and A. N. Sysoev. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, May 1950, p. 493-495.

Rate of atmospheric oxidation of cathodic Cu was investigated in relation to conditions of electrolysis and the structure of the deposits obtained. Deposits on electrolytic rolled copper obtained at 5 amp. per sq. dm. are compared to those obtained at 1 amp. per sq. dm. (L21, R2, Cu)

546-L. Overvoltage of Hydrogen on Solid and Spongy Deposits of Copper. (In Russian.) G. P. Maitak. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, May 1950, p. 496-505.

Hydrogen overvoltages on Cu deposits obtained by electrolysis of solutions of $CuSO_4$ and of $CuSO_4$ in H_2SO_4 at currents of 0.001-1.0 amp. per sq. cm. were investigated. This range includes all deposits from hard bright ones to porous spongy ones. A parallelism was noted between the change of lattice parameters of black spongy deposits and hydrogen overvoltage on them. 23 ref. (L17, Cu)

547-L. Hard Facing of the Cutting Surfaces of Peat-Cutting Machines. (In Russian.) B. M. Kontorov and P. S. Kibrik. *Torfyanaya Promphlennost*

(Peat Industry), v. 27, Apr. 1950, p. 16-20.

Selection of wear-resistant hard-alloy welding electrodes. Composition of two new electrodes which are especially applicable. Welding techniques. (L24, T28, TS)

548-L. Periodic Reverse-Current Electroplating. Adolph Bregman. *Metal Progress,* v. 58, Aug. 1950, p. 199-200, 261-263.

Jernstedt's "PR" process for making electroplates smooth enough to require no buffing or polishing. Information on three types of equipment, on Cu, Ag, Zn, Cd, Au, and Ni plating baths. Applications, advantages, and cost data. (L17, Cu, Ag, Zn, Cd, Au, Ni)

549-L. Electrodeposition of Tungsten Alloys. *Metal Progress,* v. 58, Aug. 1950, p. 244, 246.

Previously abstracted from article by F. W. Salt. *Murex Limited Review.* See item 179-L. 1950. (L17, W)

550-L. New Hard Coating Gains Wear Applications for Aluminum. *Materials & Methods,* v. 32, Aug. 1950, p. 62-64.

"File-hard" coating called "MHC" developed by Glenn L. Martin is basically an electrochemically produced film of Al_2O_3, although exact character has not been revealed. Processing characteristics, wear resistance, hardness, ductility, endurance limit, electrical conductivity, coefficient of friction, and thermal corrosion resistance. Applications. Graph compares wear resistance with that of other metals and metallic coatings. (L19, Q9, Al)

551-L. Drag-Out Losses in Wire Plating. Parts II-III. Joseph B. Kushner. *Wire and Wire Products,* v. 25, Aug. 1950, p. 646-648, 695-697.

Recommendations for reduction of losses. Use of recovery rinse baths to recover material carried out of the plating tank. Mathematical analysis of the process and how the equations can be applied to practical problems. (L17)

552-L. Mechanical Scaling of Low Carbon Steel Rods. J. Peignier. *Wire and Wire Products,* v. 25, Aug. 1950, p. 649-650, 693-694.

Process for mechanical descaling developed in France during World War II because of the shortage of pickling acids. The process was used on 0.197-in. rods but is believed to be suitable for rods up to ½ in. diam. Advantages over chemical pickling should lead to rapid commercial development. Mechanical properties of mechanically descaled and chemically pickled wire are compared. (L10, CN)

553-L. Causes and Correction of Finishing Material Defects. Paul O. Blackmore. *Paint, Oil and Chemical Review,* v. 113, Aug. 3, 1950, p. 18, 20, 22, 48, 50-51; Aug. 17, 1950, p. 19-20, 36-40, 42.

Includes section on finishes for metals. (L26)

554-L. Chromate Protection for Metals. *Chemical Age,* v. 63, Aug. 5, 1950, p. 199-200.

Corrosion-preventive characteristics of chromates and dichromates. (L14)

555-L. Defects in Enamelling. *Foundry Trade Journal,* v. 89, Aug. 3, 1950, p. 131-132.

Specimens of enameled ware which showed various types of defects, some of relatively frequent occurrence and some only rarely encountered. (L27, Fe)

556-L. (Book) **Galvanotechnik** (Electroplating) Hugo Krause. Ed. 12. 310 pages. 1949. K. F. Koehler Verlag, Eberhardstrasse 10, Stuttgart, Germany. 7.80 DM.

While intended primarily as a manual for the practical man, the author has attempted to acquaint his readers with the electrochemical phenomena involved in the production of coatings by electrodeposition and by the so-called "immersion" process. (L17)

M

METALLOGRAPHY, CONSTITUTION AND PRIMARY STRUCTURES

228-M. Electron Microscopy in the United States. W. W. MacDonald. *Electronics,* v. 23, Aug. 1950, p. 66-69.

Apparatus, procedures, and applications. Suggestions for improvement of future designs and techniques. (M21)

229-M. Internal Motion and Molecular Structure Studies by Electron Diffraction. II. Interpretation and Method. J. Karle and I. L. Karle *Journal of Chemical Physics,* v. 18, July 1950, p. 957-962.

Application of a recently developed objective procedure to analysis of electron-diffraction photographs from more complex molecules. Some of the theoretical and experimental aspects of the procedure. Physical significance of measured vibrational amplitudes, method for drawing a background line, calibration of photographic plates, and computation of intensity curves by means of IBM machines. (M22)

230-M. Atomic Space-Lattice and the Metallic State. T. A. Hoffmann. *Journal of Chemical Physics,* v. 18, July 1950, p. 989-990.

A simple linear model for a metal was developed by Hoffmann and Konya on the basis of the molecular orbital method. These results are now extended to the space model using some mathematical results of Rutherford. Provisionally this method is applied to metals of simple cubic-lattice structures for the case of a very large lattice constant. (M26)

231-M. Improvements in Methods for Preparing Thin Sections of Rock. Harold L. Gibbs and LaMar G. Evans. *U. S. Bureau of Mines,* Report of Investigations 4711, June 1950, 6 pages.

Established and several new techniques used for microscopic examination of rocks, ores, and metallurgical products. (M21)

232-M. The Effect of Electron Concentration on the Lattice Spacings in Magnesium Solid Solutions. H. Jones. *Philosophical Magazine,* ser. 7, v. 41, July 1950, p. 663-670.

The hypothesis that change in the c/a ratio in Mg solid solutions is due to the changes in the Fermi energy, arising from distortion of the Brillouin zone, is developed into a more general and quantitative theory. The case of monovalent solutes is considered, and agreement with experiment is shown to be satisfactory. Results permit deductions to be made regarding the density of electronic states in pure Mg. (M26, Mg)

233-M. Polishing Metallographic Specimens of Non-Ferrous Metals and Alloys; Use of Diamond Dust. E. C. W. Perryman. *Industrial Diamond Review,* new ser., v. 10, June 1950, p. 179-181.

See abstract from *Journal of the Institute of Metals,* item 170-M, 1950. (M21, EG-a)

234-M. Summarized Proceedings of a Conference on X-Ray Analysis—Leamington Spa, 1949. C. H. Carlisle and A. E. De Barr. *British Journal of Applied Physics,* v. 1, July 1950, p. 161-171.

The first session was devoted to a discussion on "The interaction of structure and chemical behavior" and the second to "Geiger counter techniques in X-ray analysis". Papers and accompanying discussion are summarized. 45 ref. (M23)

235-M. The Crystal Structure of Mo_3Si. (In English.) D. H. Templeton and Carol H. Dauben. *Acta Crystallographica,* v. 3, July 1950, p. 261-262.

Structure was determined from powder-diffraction patterns. The structure is that of β-tungsten and the compound is isostructural with Cr_3Si and V_3Si. (M26, Mo, Si)

236-M. A New Weissenberg Technique Using a Double Slit. (In English.) H. P. Stadler. *Acta Crystallographica,* v. 3, July 1950, p. 262-264.

Describes a new method of recording the nth and zero layers of the reciprocal lattice simultaneously by means of a Weissenberg goniometer with two screen slits. (M23)

237-M. An Integrating Weissenberg Apparatus for X-Ray Analysis. (In English.) E. H. Wiebenga and D. W. Smits. *Acta Crystallographica,* v. 3, July 1950, p. 265-267.

With the modified instrument described, it is possible to measure the integrated reflection intensities with an accuracy equal to, or even better than, that obtained with an integrating photometer, and in a time comparable with that required for visual estimation. (M23)

238-M. A Geiger-Counter Technique for the Measurement of Integrated Reflexion Intensity. (In English.) W. Cochran. *Acta Crystallographica,* v. 3, July 1950, p. 268-278.

A Geiger-counter spectrometer is used for single-crystal measurements. Two methods by which integrated reflection intensity may be measured in a short time, despite the nonlinear response of the Geiger counter to X-ray intensity. Advantages and disadvantages of the balanced-filter method of monochromatization. Relation between counting rate and X-ray intensity. 14 ref. (M23)

239-M. Precision Measurements of Lattice Parameters of Non-Cubic Crystals. (In English.) A. Taylor and R. W. Floyd. *Acta Crystallographica,* v. 3, July 1950, p. 285-289.

Extrapolation method and its application to Co and Ni_2Ti. 18 ref. (M23, Co, Ni, Ti)

240-M. Anomalous X-Ray Reflexions From Copper Crystals. (In English.) W. A. Rachinger. *Acta Crystallographica,* v. 3, July 1950, p. 312-313.

Phenomenon is shown to be due to a double reflection of the incident X-ray beam, first by a (111) and then by a (113) plane. (M22, Cu)

241-M. Two Aids for the Calculation of Crystal Structure Factors. (In English) G. Hagg. *Acta Crystallographica,* v. 3, July 1950, p. 315-316.

Simple calculating-machine procedures. (M23)

242-M. Double-Diffraction Effects on X-Ray Diagrams From Polycrystalline Test Specimens of an Aged Ag-Cu Alloy. (In Russian.) A. I. Pashilov. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 11, 1950, p. 281-283.

Investigated on coarse-grained specimens from a saturated solid solution of Ag-Cu containing 6.5% Cu, subjected to various heat treatments. After annealing at 250° C. for more than 25 min., a definite

double-diffraction effect was observed. Probable causes of this phenomenon are indicated on the basis of theoretical considerations. (M22, Ag)

243-M. The Determination of Electron Microscope Magnification. R. S. Pease. *Journal of Scientific Instruments,* v. 27, July 1950, p. 182-186.

Method in which movements of the object and image are measured and compared. Movements of the specimen stage are investigated directly with a variable-gap Fabry-Perot interferometer mounted inside the microscope. Movements of the order of 5μ are controlled and measured to within 1%. Mechanical measurement of specimen movements is capable of the same order of accuracy. (M21)

244-M. Increase of Temperature in Metallic Test Specimens When Investigated in the Electron Microscope. (In French.) Hubert Forestier, Charles Haasser, and Micheline Uhl. *Comptes Rendus* (France), v. 230, June 12, 1950, p. 2080-2082.

The above phenomenon was studied systematically for different grain sizes and for metals located throughout the periodic table. (M21, M27)

245-M. Application of Electron Microscopy in the Study of Cr-Mo Steels Subjected to Creep at High Temperatures. (In French.) P. Coheur, L. Habraken, and J. Hébert. *Revue de Métallurgie,* v. 47, June 1950, p. 472-476.

Three types of Cr-Mo steel were investigated at 550° C. under loads of 16 and 19 kg. per sq. mm. Several conclusions concerning transformations taking place under such conditions. Photomicrographs and electron micrographs. (M21, Q3, AY)

246-M. Grain Size Measurement; Details of a New Microscope Fitting. G. T. Callis and R. S. Moore. *Metal Industry,* v. 77, Aug. 4, 1950, p. 67-68, 71.

Instrument eliminates the necessity of measuring each intercept separately, thus greatly reducing time requirements. (M21, M27)

247-M. Physical Chemistry of Metallurgical Processes. IV. Structure of Solid Phases and Mechanism of Metallurgical Reactions Between Gases and Solids. (In French.) Maurice Rey. *Revue de Métallurgie,* v. 47, Apr. 1950, p. 260-270.

Continues extensive descriptive review of the literature. 36 ref. (To be continued.) (M26, N15)

N

TRANSFORMATIONS AND RESULTING STRUCTURES

161-N. Measurement of Self-Diffusion of Silver Without Radioactive Tracers. G. C. Kuczunski. *Journal of Applied Physics,* v. 21, July 1950, p. 632-635.

New method for measurement of volume self-diffusion is based upon the relationship of rate of sintering of metallic wires to coefficients of self-diffusion. The values of the self-diffusion coefficients for silver obtained by this method are in good agreement with those obtained by the radioactive-tracer method. (N1, Ag)

162-N. X-Ray Measurement of Long Range Order in β-Brass. D. Chipman and B. E. Warren. *Journal of Applied Physics,* v. 21, July 1950, p. 696-697.

Determined by measuring the integrated intensity of the (100) superstructure reflection from a single crystal held at various temperatures. The measured long-range-order parameter S is in satisfactory agreement with theoretical predictions. (N10, Cu)

163-N. Continuous Pole Figure Study of Magnetic Recrystallization. (In English.) R. Smoluchowski and R. W. Turner. *Physica,* v. 16, Apr. 1950, p. 397-401.

Equipment and procedures for study of the effect of a magnetic field applied during recrystallization on preferred orientation of grains in a magnetic alloy. Typical results are illustrated. (N5, M23)

164-N. Analogies Between Steels and Aluminium Bronzes. H. Laplanche. *Institute of British Foundrymen,* Paper No. 911, 1950, 17 pages (Advance Copy).

Analogy between thermal diagrams of Fe-Fe_3C and Al-Cu; of microstructure after very slow cooling; of as-cast structures, in martensitic transformation, between additive isothermal decomposition of γ-phase in steels and β-phase in Al-bronzes. 149 ref. (N8, N9, ST, Cu)

165-N. A Theory of Globular Graphite Formation in Cast Iron. (In Japanese.) Ichiro Iitaka. *Journal of the Casting Institute of Japan,* v. 22, no. 2, 1950, p. 1-5.

Theory is developed strictly on a fundamental physicochemical basis. It is said to be consistent with known experimental observations. (N8, CI)

166-N. Austenite Formation During Tempering and Its Effects on Mechanical Properties. E. F. Bailey and W. J. Harris, Jr. *Journal of Metals,* v. 188, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 997-1000.

Results of experiments on kinetics of austenite formation for a low-C, Mn-Ni steel on tempering at various temperatures; on decomposition characteristics; and on relation of mechanical properties and phases present. 12 ref. (N8, Q general, AY)

167-N. Recrystallization Reaction Kinetics and Texture Studies of a 50 Iron, 50 Nickel Alloy. William E. Seymour and David Harker. *Journal of Metals,* v. 188, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1001-1004.

Recrystallization-rate curves are plotted from X-ray spectrometer data and activation energy is calculated for the reaction. A multiple-crystal orientation was found for the as-rolled material, and a cube texture for the product of recrystallization in the range 500-600° C. (N5, M26, Ni, Fe)

168-N. Production and Examination of Zinc Single Crystals. D. C. Jillson. *Journal of Metals,* v. 188, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1005-1008.

Method and equipment developed and used for growth of single crystals of high purity Zn, of substantial size and of various orientations, in substantial numbers, together with results of some tests of degree of perfection of the product. 11 ref. (N12, Zn)

169-N. An Experimental Survey of Deformation and Annealing Processes in Zinc. D. C. Jillson. *Journal of Metals,* v. 188, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 1009-1018.

Zn single-crystal specimens of high purity and quality were used in a study of various types of deformation under various conditions. Deformed specimens were annealed to study recovery and recrystallization. Profitable areas for more detailed work. 50 ref. (N4, N5, Q24, Zn)

170-N. "Check-Mark" Defects Appearing on Electrolytic Copper Wires. (In Portuguese.) Mario Silva. *Boletim da Associacao Brasileira de Metais,* v. 6, Jan. 1950, p. 13-25.

Data indicate that the cause of this defect is the presence of the eutectic Cu-Cu_2O which is localized in the upper part of the billet between the grains of pure Cu. Method of avoiding this defect is indicated. (N12, Cu)

171-N. Carbide Formation During Isothermal Decomposition of Austenite in Chromium Steels. (In Russian.) B. Yu. Mett and R. I. Entin. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 21, 1950, p. 497-500.

Experimentally investigated for three Cr steels having A_3 critical points at 835, 865, and 905° C., respectively. (N8, AY)

172-N. Solid Solubility of Tin in Aluminum. (In Russian.) T. A. Badaeva and R. I. Kuznetsova. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 21, 1950, p. 507-509.

Investigated by determination of microstructure, changes of electric resistance, and lattice parameters. Differential heating curves of alloys annealed at 210° C. were also obtained. (N12, Sn, Al)

173-N. Metastability of Iron-Carbon Alloys. (In Russian.) K. P. Bunin and N. M. Danil'chenko. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 11, 1950, p. 889-890.

On the basis of theoretical considerations, a solution for the causes of the metastability in Fe-C alloys is proposed. Experimental data confirm the theoretical explanation. (N8, ST)

P

PHYSICAL PROPERTIES AND TEST METHODS

227-P. Sweat Cooling. H. L. Wheeler, Jr., and Pol Duwez. *Automotive Industries,* v. 103, July 15, 1950, p. 40, 110, 112.

Sponsored by U. S. Army Ordnance Dept., California Institute of Technology has made a study of cooling by injection of a fluid through porous walls. Some of the important test results and conclusions. Apparatus is diagrammed and heat-transfer data for a Ni-Mo-Fe alloy and for Cu are charted. (P11, Ay, Cu)

228-P. An Absolute Measurement of Copper-Copper Interfacial Free Energy. G. W. Sears. *Journal of Applied Physics,* v. 21, July 1950, p. 721.

Procedure and results of first measurement of its kind to be reported (P10, Cu)

229-P. Ultrasonic Measurement Techniques Applicable to Small Solid Specimens. H. J. McSkimin. *Journal of the Acoustical Society of America,* v. 22, July 1950, p. 413-418.

Phase comparison at high ultra-

sonic frequencies was found to be particularly suited to velocity of propagation measurements (and hence measurement of elastic constants) for small solid specimens such as single crystals. Pulse technique is used. Data for fused silica and single-crystal germanium. (P10, Ge)

230-P. Evaluation of the Magnetostrictive Properties of Hiperco. H. Sussman and S. L. Ehrlich. *Journal of the Acoustical Society of America*, v. 22, July 1950, p. 499-506.

Magnetostrictive properties of Hiperco, a magnetic alloy of Fe, Co, and Cr, were investigated to determine its suitability as a material for electromechanical transducers. Relations between magnetic and magnetostrictive characteristics of a material and its performance as a transducer element. The properties of Hiperco, measured after a suitable heat treatment, are discussed in relation to those criteria and a comparison made with Ni and Permendur. Performance data for a small underwater transducer constructed of Hiperco operating at remanence. (P16, SG-n)

231-P. Effect of Nuclear Reactor Radiation on Metals. D. S. Billington. *U. S. Atomic Energy Commission*, AECD-2810, Mar. 22, 1950, 10 pages.

Effect of radiation on density, electrical resistivity, hardness, and elastic modulus of Al, Cu-Au, Cu-Be, and stainless steel. (P10, P15, Q29, Q21, Al, Cu, SS)

232-P. A Survey of the Reflectivity of Some Common Metals and Alloys. A. H. Unckel. *Sheet Metal Industries*, v. 27, July 1950, p. 654-658.

Measurements were made on a wide variety of metals, using a "glossmeter" manufactured by General Electric Co., Ltd. (P17)

233-P. Some Properties of High Resistivity P-Type Germanium. W. C. Dunlap. *Physical Review*, ser. 2, v. 79, July 15, 1950, p. 286-292.

Hall effect, resistivity, and rectification characteristics were studied with respect to changes of temperature and magnetic field. 13 ref. (P15, Ge)

234-P. Magnetoresistance of Germanium Samples Between 20° and 300° K. I. Estermann and A. Foner. *Physical Review*, ser. 2, v. 79, July 15, 1950, p. 365-372.

Resistivity of "pure" Ge samples and of samples with small additions of Al, Sb, and In, was measured at various temperatures and at various orientations in external magnetic fields. Results were compared with those resulting from the theoretical investigation of a classical electron gas in combined electric and magnetic fields in an isotropic medium and in a medium possessing cubic symmetry. 15 ref. (P16, Ge)

235-P. Meissner Effect in Superconducting Alloys of Indium and Thallium. J. W. Stout and Lester Guttman. *Physical Review*, ser. 2, v. 79, July 15, 1950, p. 396.

Magnètic properties associated with the superconductivity of solid solutions containing 5, 10, 15, and 20 at .% Tl in In were investigated. Behavior resembled much more that of pure metals than has been found previously for alloys. In particular, most of the magnetic flux is expelled on decreasing the magnetic field below a critical value (Meissner effect). (P16, In)

236-P. Superconducting Bismuth Alloys. Joseph M. Reynolds and C. T. Lane. *Physical Review*, ser. 2, v. 79, July 15, 1950, p. 405-406.

Shoenberg in 1938 suggested that if an alloy of uniform composition could be prepared, it might be expected to show the characteristics of an ideal superconductor. The best chance of producing such an alloy would be to use "intermetallic compounds". The authors investigated NaBi and KBi_2. Results support the Shoenberg hypothesis. (P15, Bi)

237-P. Electronic Mobility in Germanium. V. A. Johnson and K. Lark-Horovitz. *Physical Review*, ser. 2, v. 79, July 15, 1950, p. 409-410.

Resistivity behavior of a large number of Ge samples prepared by adding varying amounts of various elements to high-purity Ge was reported in previous papers. Attempts to explain certain discrepancies in mobility behavior by a modification of the classical Hall coefficient expression. (P15, Ge)

238-P. Time Decrease of Magnetic Permeability in Alnico. R. Street and J. C. Woolley. *Proceedings of the Physical Society*, v. 63, sec. B, July 1, 1950, p. 509-519.

The formal theory, based on the concept of thermal activation of domain processes, previously proposed to account for the phenomenon of magnetic viscosity, is extended to describe time decrease of permeability. Within certain limits, predictions of theory are verified by measurements using an Alnico rod. (P16, SG-n)

239-P. The Magnetic Properties of Uranium and Uranium-Iron Alloys. L. F. Bates and J. R. Mallard. *Proceedings of the Physical Society*, v. 63, sec. B, July 1, 1950, p. 520-526.

Measurements were made of the magnetic susceptibility of fairly pure U and of alloys with 5 and 10 atomic % Fe. The specimens were found to be paramagnetic with no trace of ferromagnetism from 20 to 350° C. 15 ref. (P16, U)

240-P. The Effect of Occluded Hydrogen on the Electrical Resistance of Palladium. R. Wright. *Proceedings of the Physical Society*, v. 63, sec. A, July 1, 1950, p. 727-739.

Theoretical and experimental investigations of the absorption of hydrogen by Pd indicates that, at least at higher temperatures, the hydrogen is contained in solid solution. Apparatus for observing changes in electrical resistance of Pd during absorption and evolution of hydrogen, with which resistance-pressure isotherms from 75 to 150° C. were obtained for pressures increasing and decreasing between zero and atmospheric. Factors affecting the resistance of the Pd-H system and an explanation of the form of the isotherms. 20 ref. (P15, Pd)

241-P. The Barkhausen Effect. R. S. Tebble, I. C. Skidmore, and W. D. Corner. *Proceedings of the Physical Society*, v. 63, sec. A, July 1, 1950, p. 739-761.

Experiments on cylindrical ferromagnetic specimens. The form of the decay of induction following a Barkhausen discontinuity was investigated. Reasonable agreement between theory and experimental results was achieved. Specimens were hard-drawn iron, large-grained iron, and annealed nickel. (P16, Fe, Ni)

242-P. Domain Wall Movement in a Single Crystal. K. H. Stewart. *Proceedings of the Physical Society*, v. 63, sec. A, July 1, 1950, p. 761-765.

A single crystal of 3% Si iron was shaped so as to encourage the formation of large ferromagnetic domains. Its magnetization curve was found to contain a large Barkhausen jump, indicating reversal of magnetization in a volume of the order of 1/10 cc. Rate of change of magnetization was found to be proportional to excess of applied magnetic field over a certain critical field, and could be made very slow. Suggests that rate of change is controlled by the braking effect of eddy currents on the movement of domain walls. (P16, Fe)

243-P. Nuclear Magnetic Relaxation in Metallic Lithium and Aluminium. (In English.) N. J. Poulis. *Physica*, v. 16, Apr. 1950, p. 373-376.

Nuclear magnetic relaxation was observed in metallic Al at a frequency of 9.5 mc. per sec. and in Li at 15.2, 9.5, and 6.4 mc. per sec. Relaxation time was measured at temperatures from 20 to 1.2° K. (P16, Li, Al)

244-P. Magnetic Properties as a Means of Studying Metals and Alloys. (In Czech.) Bohdan Sestak and Ladislav Jenicek. *Hutnické Listy*, v. 5, Apr. 1950, p. 155-162.

How magnetic properties can be used for study of ferromagnetic metals and alloys, these being influenced by temperature, composition, phase state and changes, and by structure. The magnetic balance on induction apparatus used for study of isothermal breakdown of austenite, magnetic determination of residual austenite; determination of magnetic anisotropy; and classification of steel on the basis of differences in magnetic properties. (P16, SG-n)

245-P. Concerning Magnetic Structure Formed in Soft Magnetic Materials as a Result of Thermo-Mechanical Treatment. (In Russian.) Ya. S. Shur and F. N. Dunaev. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 11, 1950, p. 293-296.

Results of experimental investigation showed that thermomechanical treatment (cooling from a high temperature under uniaxial stress) of 3.5% Si iron, 56% Ni and 1% Mo Permalloy, Cu Permalloy, and Permindur (49% Fe, 49% Co, 2% V) results in preferred orientation of magnetic domains. Theoretical explanation is verified experimentally. (P16, SG-p)

246-P. Temperature Dependence of Emission of Photosensitive Particles During the Atmospheric Corrosion of Magnesium and Zinc. (In Russian.) I. L. Roikh and F. E. Mazaev. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 11, 1950, p. 335-338.

Analysis of experimental data resulted in development of an empirical equation for the above relationship and for the energy of activation of the photosensitive particles. (P17, R3, Mg, Zn)

247-P. The Study of "Senperm" and Iron-Silicon-Nickel Alloys During the Formation of Superlattices. (In Japanese.) Tatuzi Yamamoto. *Ninpon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 1-5.

Some years ago, the author discovered that Fe-Si-Ni alloys containing 8-12% Si, 14-18% Ni, balance Fe, have the characteristics of "perminvar". These were designated as "Senperms". Electrical resistance at high temperatures, and dependence of electrical resistance, saturation induction, and saturation magnetization on heat treatment and composition, were studied. Results show that magnetic properties are similar to those of Permalloy and that order-disorder transformation takes place near 350-370° C. (P16, N10, SG-n)

248-P. A Study on the Anisotropy of Cold-Rolled Silicon Steel. I. (In Japanese.) Isao Gokyu, Hideo Abe, and Hisashi Takahashi. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 9-12.

Object of study is to obtain the best magnetic anisotropy by annealing at comparatively low temperatures, say about 800°. Experiments were made on cold rolling and recrystallization textures, and the relation between cold rolling texture and orientation was considered from a crystallographic point of view. (P16, N5, AY)

249-P. Designing Bimetal Control Devices. U. Savolainen. *Product Engineering*, v. 21, Aug. 1950, p. 115-119.

Applications, design formulas, and tabular data for various types of temperature-actuated devices. Thermostatic properties of most common bimetals are tabulated. (P11, S16, SG-a)

250-P. A Recording Fluxmeter of High Accuracy and Sensitivity. P. P. Cioffi. *Review of Scientific Instruments*, v. 21, July 1950, p. 624-628.

Instrument by which magnetization curves and major and minor hysteresis loops of ring and bar samples can be traced in a few minutes compared to several hours required by the ballistic method. (P16)

251-P. Anomalies of Propagation of Ultrasonic Vibrations in Metals in Connection With Their Structures. (In French.) E. de Kerversau, J. Bleton, and P. Bastien. *Revue de Métallurgie*, v. 47, June 1950, p. 421-444; discussion, p. 444-446.

Theoretical investigation of the mechanism of production of the above anomalies, and an investigation of phenomena taking place in complex structure. Includes studies of eutectoid and hypereutectoid structures of carbon steels, comparative behavior of the same Ni-Cr-Mo steel having bainitic and pearlitic structures, and structures of overheated Ni-Cr-Mo steel. (P10, M27, ST)

252-P. Theory of Magnetically Inhomogeneous Surface Layers in Transformer Sheets. (In German.) Richard Feldtkeller. *Frequenz*, v. 4, June 1950, p. 129-134.

Investigations revealed the fact that permeability of transformer sheets varies greatly with distance from the surface. The effect of eddy currents on complex permeability of sheets with finite surface permeability is computed. (P16, EG-p)

253-P. Surface Tension of Liquid Metals. *Metal Progress*, v. 58, Aug. 1950, p. 252, 258-259, 261. Translated and condensed from "The Surface Tension of Liquid Metals and Alloys", E. Pelzel, *Berg- und Huttenmannische Monatshefte*, v. 93, 1948, p. 247-254; v. 94, 1949, p. 10-17.

The method of "maximum bubble pressure" developed by Cantor, Jaeger, and Sauerwald was used to determine surface tension. Results for Zn and Sn agree well with those of other investigators. Data for Al and Mg were determined for the first time. Surface tension of the intermetallic-compound systems Al-Mg and Mg-Zn and of two systems which do not form intermetallic compounds (Sn-Zn and Al-Zn) was studied. (P10, Zn, Sn, Al, Mg)

254-P. Oriented Crystals: Their Growth and Their Effects on Magnetic Properties. Weston Morrill. *General Electric Review*, v. 53, Aug. 1950, p. 16-21.

Increasing knowledge of influences and resultant configurations in manufacture and processing of materials gives promise of control and effective utilization of specific properties. (P16, N5, SG-n, p)

255-P. Magnetization Curves for Polycrystalline Ferromagnetics. H. Lawton and K. H. Stewart. *Proceedings of the Physical Society*, v. 63, sec. A, Aug. 1, 1950, p. 848-851.

Recent developments have led to greatly improved agreement between theory and experiment for the magnetization curves of single crystals of Fe and Fe-Si in the range 10-500 oersteds. On the basis of the assumption that in polycrystalline material magnetization is approximately uniform from grain to grain, a method is developed for deriving magnetization curves of such material by averaging the fields required to produce a given magnetization in the different constituent grains, rather than by averaging the magnetizations produced in the different grains by a given field. Application of this method gives results in fair agreement with experiment. (P16, SG-n, p)

256-P. The Mechanism of Colloid Agglomeration in the Formation of Bitter Patterns. C. D. Mee. *Proceedings of the Physical Society*, v. 63, sec. A, Aug. 1, 1950, p. 922.

Recently Bates and Neale described quantitative measurements on powder patterns, formed on Fe-Si single crystals, in which the spacing of the powder deposits was found to be twice the domain width. An explanation is furnished by some patterns observed on a Co single crystal. Illustrated. (P16)

257-P. The Optical Emissivity of Titanium and Zirconium. F. J. Bradshaw. *Proceedings of the Physical Society*, v. 63, sec. B, Aug. 1, 1950, p. 573-577.

A method of measuring emissivity using eddy-current heating. The specimen consisted of a cylinder of metal drilled with a small blackbody hole, and its real and apparent temperatures were measured with an optical pyrometer at a mean wavelength of 0.652μ. Variation of emissivity with temperature was investigated. (P17, Ti, Zr)

258-P. Static Computation of the Curie Point of Ferromagnetic Crystal Lattices. (In German.) V. Zehler. *Zeitschrift für Naturforschung*, v. 5a, June 1950, p. 344-345.

Opechowski's method; results agree closely with those of Weiss. (P16)

259-P. Influence of Boron on the Surface Tension of "Type Kh15N25" Steel. (In Russian.) Yu. A. Klyachko, L. L. Kunin, N. S. Kreshchanovskii, and E. S. Ginzburg. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 11, 1950, p. 927-928.

Investigated for molten steel containing 26.09% Ni, 15.44% Cr, 0.40% Mn, 0.26% Si, 0.04% C, 0.028% S, and 0.021% P. Boron was added in the form of ferroboron containing 18% B, in amounts corresponding to 0.06-0.3% of the total weight. Macro and microstructures are illustrated. (P10, N12, SS)

260-P. (Book) **Data on Corrosion and Heat Resistant Steels and Alloys—Wrought and Cast.** Russell Franks, J. W. Juppenlatz, V. N. Krivobok, F. L. LaQue, F. P. Peters, and E. A. Schoefer. *American Society for Testing Materials*, Special Technical Publication No. 52-A, 1950, 79 pages.

Data on physical and mechanical properties for wrought Cr steels, Cr-Ni steels, and cast corrosion and heat resistant alloys. (P general, Q general, AY, SG-g, h)

For Metal Show Advance Registration See page 61

Q

MECHANICAL PROPERTIES AND TEST METHODS; DEFORMATION

545-Q. Alloys Widen Use of Titanium. John Anthony. *Iron Age*, v. 166, July 27, 1950, p. 60-62.

Properties of Ti and several alloys now being offered commercially in a wide range of fabricated products and forms. Mechanical-property data are tabulated. (Q general, Ti)

546-Q. Tests of Steel Girder Spans on the Chicago & North Western Railway; Advance Report of Committee 30—Impact and Bridge Stresses. *American Railway Engineering Association, Bulletin*, v. 52, June-July 1950, p. 1-91.

Analyzes test data secured on three deck-plate girder spans. Stresses were measured under 100 diesel and 386 steam locomotives by means of electromagnetic strain gages, with oscillograph recordings, in various parts of the bridges. Bridge details and strain-gage locations are shown diagrammatically. (Q25, T26, T23, CN)

547-Q. Properties of Alloy Steels. *Industrial Heating*, v. 17, July 1950, p. 1170, 1172, 1174.

Abstracts of the papers presented at Alloys Steels Session I, 31st annual convention of ASM, Cleveland, Oct. 1949. The four papers cover studies of the tensile properties of heat treated low-alloy steel at subzero temperatures, relationship of inclusions and transverse ductility in a Cr-Ni-Mo gun steel, constitution of high-speed steel as affected by V and C, and unnotched impact strength of high-speed steels. (Q general, N8, AY, TS)

548-Q. Conservation of Columbium. John F. Tyrrell. *Metal Progress*, v. 58, July 1950, p. 63-68.

To conserve columbium, it is important to substitute Type 321 (Ti-stabilized) stainless steel for Type 347 (Cb-stabilized) wherever it can be done without sacrifice in performance. Extensive experience shows no difference in service behavior between Types 321 and 347 in aircraft components operating up to about 1500° F. In fabrication and initial cost, there are definite advantages in using Type 321. Weldability, formability, sand castability, and mechanical properties are compared. 11 ref. (Q general, K9, SS)

549-Q. Test Bar Results Compared With Tests on Components. H. J. Maier. *Metal Progress*, v. 58, July 1950, p. 72-75.

Critically discusses recent article by A. L. Boegehold (Mar. issue, item 203-Q, 1950). Includes Mr. Boegehold's reply. (Q25, J26, ST)

550-Q. Residual Stresses in Chromium-Plated Steel. Hugh L. Logan. *Metal Progress*, v. 58, July 1950, p. 75-76.

Recent tests at the National Bureau of Standards showed that the fatigue limits of steel specimens heated after plating first decrease and then increase with increased baking temperature. The decrease in fatigue limit was correlated with increased tensile stresses induced by low-temperature baking. (See abstract of "Effect of Chromium Plating on Endurance Limit of Steels Used in Aircraft", *Journal of Research of the National Bureau of Standards*, item 3B-219, 1949.) (Q25, L17, Cr, ST)

551-Q. Residual Stress and Fatigue Strength. D. Rosenthal and George Sines. *Metal Progress,* v. 58, July 1950, p. 76.

Shows experimentally that an improvement of almost 100% in permissible stress and a fatigue life increased by 10 times can be realized by changing residual stress from tension to compression. Data are for 61S-T6 Al plate. (Q25, Q7, Al)

552-Q. The Modulus of Elasticity—A Review of Metallurgical Factors. John E. Dorn and Thomas E. Tietz. *Metal Progress,* v. 58, July 1950, p. 81-84.

Data from the literature are correlated, graphed, and discussed. (Q21)

553-Q. Effect of Temperature on the Modulus of Elasticity. Charles W. Andrews. *Metal Progress,* v. 58, July 1950, p. 85-89.

New data on temperature variation of Young's modulus for the following metals: Stellite 21, Inconel, four austenitic stainless steels, Armco iron, SAE 4130, and 75S Al alloy. A dynamic method of testing was used in which the specimen is vibrated transversely at its resonant frequency. (Q21, Co, Ni, SS, Fe, AY, Al)

554-Q. Dynamic Modulus. *Metal Progress,* v. 58, July 1950, p. 96, 98, 100.

Complete details of theory and practice of method used in work described in article by Andrews (see item 553-Q, above). 10 ref. (Q21)

555-Q. Stress Analysis for Compressible Viscoelastic Materials. W. T. Read, Jr. *Journal of Applied Physics,* v. 21, July 1950, p. 671-674.

Mathematical methods of stress analysis for linear, compressible, viscoelastic or anelastic materials such as metals at high temperatures, or high polymers with small strains. For such materials stress, strain, and their time derivatives of all orders are related by linear equations with coefficients which are material constants. Fourier integral methods are used to show that static-elasticity solutions can be used to determine time-dependent stresses in visco-elastic bodies with any form of boundary conditions. (Q25)

556-Q. Interpretation of Fracture Markings. J. A. Kies, A. M. Sullivan, and G. R. Irwin. *Journal of Applied Physics,* v. 21, July 1950, p. 716-720.

Study of the sequence of events by which cracks "grow". A careful investigation was made of the origin, development, and characteristic pattern of markings left by rapidly moving fractures in a wide variety of materials. Characteristic markings indicating discontinuous propagation are found in fractures of plastics, metals, polycrystalline and single-crystal materials, coal, mica, etc. Results are sufficient to explain a number of well-known fracture markings and to clarify what is meant by brittleness and fracture velocity. (Q26)

557-Q. Testing Machines (Tension and/or Compression): Means of Regulating Testing Speed. H. L. McBride, compiler. *Materials & Methods,* v. 32, July 1950, p. 73.

Tabular presentation covers the various types. (Q27, Q28)

558-Q. Use of the Pendulum for the Study of Elastic Properties of Solids. M. LeRolland. *Non-Destructive Testing,* v. 8, Spring 1950, p. 16-19.

Fundamental physics of pendulum testing of metals and other solids. (Q21)

559-Q. Fitting Mathematical Theories of Plasticity to Experimental Results. F. D. Stockton and D. C. Drucker. *Journal of Colloid Science,* v. 5, June 1950, p. 239-250.

At present the analytical development of mathematical theories of plasticity for work hardening metals has far outstripped application and comparison with experimental information. Demands of experiment on theory using the classical data of Taylor and Quinney for illustration. Shows that the more varied the data the stress-strain law must fit, the more elaborate the mathematical relation required. Considers two fundamental questions: Are strain increments linear to the stress increments; and is the plastic work per unit volume independent of the path of loading provided unloading is not taking place? (Q23)

560-Q. Effect of Variation in Rivet Diameter and Pitch on the Average Stress at Maximum Load for 24S-T3 and 75S-T6 Aluminum Alloy, Flat, Z-Stiffened Panels That Fail by Local Instability. Norris F. Dow and William A. Hickman. *National Advisory Committee for Aeronautics,* Technical Note 2139, July 1950, 24 pages. (Q25, Al)

561-Q. An Investigation Into the Causes of Brittleness in Mild Steels. J. G. de Lattre. *Sheet Metal Industries,* v. 27, July 1950, p. 613-618, 628.

Systematic investigation of 20 samples from different steel plants using Thomas converters. Aging behavior, tensile strength, and percent elongation; micrographic and macrographic examination. Analogous observations on copper taken from the literature. (Q23, M27, CN, Cu)

562-Q. Proposed New Hardness Scale; Russian Work on Instruments and Method. *Chemical Age,* v. 63, July 1, 1950, p. 19-20.

Summarizes work described in recent Russian paper. (Q29)

563-Q. Aircraft-Structure Testing Equipment at Farnborough. *Engineering,* v. 169, June 30, 1950, p. 717-718 + insert.

Equipment designed for testing structures having dimensions as great as 120 ft. (Q23)

564-Q. Where Is Cast Iron Going To? (Concluded.) P. A. Russell. *Foundry Trade Journal,* v. 89, July 6, 1950, p. 7-10; discussion, p. 11-13.

Damping capacity of nodular irons and future prospects. Possibility of solving the problems of phosphorus content, porosity and shrinkage, and marketing problems (psychological). (Q8, E25, CI)

565-Q. Properties of Cast Iron at Sub-Atmospheric Temperatures. F. N. J. Gilbert. *Institute of British Foundrymen,* Paper No. 964, 1950, 24 pages (Advance Copy).

Summarizes available literature for various cast irons. Tensile and impact properties at −100° C. or lower. Dilatation tests were carried out at high and low temperatures so that results can be compared and more knowledge gained of phase change. 15 ref. (Q23, N8, CI)

566-Q. Sand-Cast Test-Bars for Copper-Base Alloys. O. R. J. Lee and B. W. Peck *Institute of British Foundrymen,* Paper No. 967, 1950, 4 pages (Advance Copy): also *Foundry Trade Journal,* v. 89, July 13, 1950, p. 31-34; discussion, p. 34-35.

Determination of mechanical properties obtainable from sand-cast test bars. Results are compared with those obtained from D.T.D.-type bars. (Q general, E11, Cu)

567-Q. Deformation Characteristics of Five Grey Cast Irons at 400 Deg. C., 500 Deg. C. C. R. Tottle. *Institute of British Foundrymen,* Paper No. 973, 1950, 9 pages (Advance Copy).

Materials, testing procedure, and temperature control. Rupture, short-time tensile, creep, and stress-to-rupture tests. 15 ref. (Q3, Q4, CI)

568-Q. Testing the Metal or Testing the Casting; Some Notes on the New Swedish Grey-Iron Specification. Erik O. Lissel. *Institute of British Foundrymen,* Paper No. 976, 1950, 15 pages (Advance Copy).

Surveys the problem related to testing and specification of gray cast iron and gray iron castings. Compares British, American, and Swedish cast-iron specifications. 39 ref. (Q general, S22, CI)

569-Q. On the Correlation of the Directional Properties of Rolled Sheet in Tension and Cupping Tests. L. Bourne and R. Hill. *Philosophical Magazine,* ser. 7, v. 41, July 1950, p. 671-681.

Plastic anisotropy in rolled sheet was examined by tension and cupping tests. Earing positions are correlated with strain ratios measured in tension tests at various orientations to the direction of rolling. The materials used were Cu giving four ears at 45°, brass giving four ears at 50°, and brass giving six ears at 0° and 60°. Hill's theory of plastic anisotropy was found to be in good agreement with experimental data for materials producing four ears. The theory is extended to describe more complex states of anisotropy. 12 ref. (Q23, Cu)

570-Q. The Determination of the Principal Stress Differences at a Point in a Three Dimensional Photoelastic Model. H. T. Jessop and M. K. Wells. *British Journal of Applied Physics,* v. 1, July 1950, p. 184-189.

The method of recording results by stereographic projection. The universal tilting microscope stage and a brief investigation of its theory. (Q25)

571-Q. Influence of Lead Additions on the Mechanical Properties and Machinability of Some Alloy Steels. J. Woolman and A. Jacques. *Journal of the Iron and Steel Institute,* v. 165, July 1950, p. 257-267.

Mechanical properties, including fatigue resistance, of a series of normal and Pb-bearing carbon and alloy steels produced from the same melt, in various conditions of heat treatment, were determined in both longitudinal and transverse directions. Effect of Pb additions on machining properties was measured in turning, sawing, and drilling tests. Effect of additions of different-sized Pb shot. (Q general, G17, AY)

572-Q. The Sliding Surface. G. I. Finch. *Proceedings of the Physical Society,* v. 63, sec. B, July 1, 1950, p. 465-483.

The fundamental principles of lubrication and friction. Effects of materials in contact and crystalline structure changes due to frictional contact are illustrated by micrographs and by electron-diffraction patterns. Effects of oxide layers. 54 ref. (Q9)

573-Q. The Effect of Impurities on the Properties of Metals. C. H. Desch. *Institution of Mining and Metallurgy.* "The Refining of Non-Ferrous Metals —A Symposium", 1950, p. 9-24.

Previously abstracted from *Bulletin of the Institution of Mining and Metallurgy.* See item 3A-191, 1949. (Q general, C general)

574-Q. Buckling of Compressed Steel Members. (In English.) Georg Wästlund and Sven G. Bergstrom. *Acta Polytechnica* (Civil Engineering and Building Construction Series), v. 1, no. 10, 1949, 172 pages.

Previously abstracted from *Transactions of the Royal Institute of Technology,* no. 56, 1949. See item 195-Q, 1950. (Q28, ST)

575-Q. Theories of the Mechanism of Fatigue Fracture. (In French.) W.

Boas. *Métaux & Corrosion*, v. 25, Apr. 1950, p. 100-104.

Theories based on experiences with polycrystalline metals; experiences with single crystals; recent progress in use of X-ray diffraction; recent theories. 22 ref. (Q7)

576-Q. Protection Against Wear. (In French.) H. Wahl. *Metaux & Corrosion*, v. 25, Apr. 1950, p. 105-113.

Defines the term "wear" and indicates different fields where this phenomenon is most often observed. A series of recommendations for protection against wear by choice of materials, design, operating conditions, application of various coatings, etc. (Q9)

577-Q. Photoelastic Analysis for the Purpose of Decreasing the Weight of Beams. (In Italian.) W. Ruff. *Alluminio*, v. 19, no. 2, 1950, p. 122-132.

A study of relationships between weights and stress concentrations. Proposes a new formula for determination of these relationships and verifies it experimentally. Illustrates its uses by application to a trapezoidal beam with two supports. (Q25)

578-Q. Some Problems in Hardness Testing. (In Czech.) **I. The Development and Principles of Hardness Testing. II. The Problem of Shore Hardness.** Ladislav Jenicek and Jaroslav Dobry. *Hutnické Listy*, v. 5, Apr. 1950, p. 163-172.

Part I: The historical development of hardness testing, showing how methods are sometimes accepted because of necessity, but later are shown to be physically invalid. However, these methods often are retained because of tradition. Part II critically discusses the validity of Shore hardness testing. Recommends abandonment of this method. 60 ref. (Q29)

579-Q. Distribution of Deformation Inside a Rolled Strip. (In Russian.) T. M. Golubev. *Izvestiya Akademii Nauk SSSR* (Bulletin of the Academy of Sciences of the USSR), Section of Technical Sciences, Apr. 1950, p. 582-590.

Results of investigation of lead specimens indicate the non-uniformity in distribution of residual deformation induced by compression of rolled material. The degree of non-uniformity is dependent on the extent of reduction during rolling, on speed of rolling, and on coefficient of external friction, assuming that other conditions of rolling are constant. 12 ref. (Q24, F22, Pb)

580-Q. Discussion of Paper by G. V. Uzhik "New Criteria for Strength of Metals" at Meeting of Section of Technical Sciences, Academy of Sciences of the USSR; Technical Cohesive Strength as a New Criterion of Strength. (In Russian.) G. V. Uzhik. *Izvestiya Akademii Nauk SSSR* (Bulletin of the Academy of Sciences of the USSR), Section of Technical Sciences, Apr. 1950, p. 594-604; 605-628.

First part is a general discussion of report based on several papers previously published by Uzhik. The second part is essentially an extended reply to the points raised in the discussion. The author presents additional theoretical analysis and experimental evidence in support of his proposed strength criteria. Photomicrographs show structures associated with failure of metals. 19 ref. (Q23, ST)

581-Q. Mechanism of Failure of Case Hardened Steel. IV. Relationship of Case Depth and Bending Properties. V. Relationship of Notch Radius and Bending Properties. (In Japanese.) Hisao Matsumoto. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 12-17.

Results of an experimental study of the above relationships using a plain carbon steel. Theory. (Q5, J28, CN)

582-Q. The Wear of Cast Iron in Sewing Machines. (In Japanese.) Syuzi Ando and Tadashi Numazu. *Journal of the Casting Institute of Japan*, v. 21, no. 3, 1949, p. 10-18.

The influence of microstructure and surface roughness of parts subject to frictional wear. Little difference was found between pearlitic and ferritic cast iron. (Q9, CI)

583-Q. Fatigue and Service Testing. Howard K. Gandelot. *SAE Journal*, v. 58, Aug. 1950, p. 39-40.

Summarizes proceedings of 1950 SAE Summer Meeting round-table discussion. Fatigue testing of axles for heavy-duty vehicles was emphasized. (Q7)

584-Q. Engine Wear. Harold Myers. *SAE Journal*, v. 58, Aug. 1950, p. 46-49.

Summarizes proceedings of 1950 SAE Summer Meeting round-table discussion. Relative merits of materials in terms of test and service-backed data were argued, including chromium plate for bearings and piston rings, cast iron vs. steel crankshafts and camshafts, tungsten-carbide tappet faces, and Ni-resist piston inserts. Ring and piston failures were described. (Q9, T21, S21)

585-Q. How Design Affects Low-Temperature Properties of Iron & Steels. *SAE Journal*, v. 58, Aug. 1950, p. 58-64. Condensed from "Low Temperature Properties of Ferrous Materials", prepared by SAE Iron & Steel Technical Committee.

Effects of low temperature on mechanical properties, giving details of test methods. Effects of metallurgical factors including heat treatment. (Q general, ST)

586-Q. Ductile Iron—in Light Sections. E. J. Laufer. *Iron Age*, v. 166, Aug. 10, 1950, p. 79-82.

Miscellaneous fittings having thicknesses of $\frac{3}{32}$ to $\frac{1}{4}$ in. are being successfully made from ductile iron. The malleable-iron foundry has been eliminated and all castings are produced in the gray-iron shop. Mechanical tests show excellent properties. Annealing cycle developed for production of maximum ductility. (Q23, J23, T6, CI)

587-Q. Apparatus for Rapid Measurement of Internal Friction. Herbert I. Fusfeld. *Review of Scientific Instruments*, v. 21, July 1950, p. 612-616.

Apparatus which satisfies the conditions of low induced stress amplitude to preclude any plastic flow of the specimen, ability to install specimen within a few minutes after treatment, rapidity of measurement, and accuracy of at least 1%. (Q22)

588-Q. Studies of the Load-Carrying Capacity of Sleeve Bearings. C. M. Allen and K. A. Davis. *Lubrication Engineering*, v. 6, Aug. 1950, p. 161-162, 182.

During a fundamental study of sleeve bearings, tests were run on materials like copper, brass, Constantan, and Invar, as well as on conventional bearing materials, with surprisingly good results. Tests were then run with various imperfections known to exist in service, such as dirty lubricant, rough surfaces, and misalignment. Under these conditions, copper still performed better than either babbitt or copper-lead. Studies are continuing to determine the cause of the unexpected results. (Q9, Cu, Ni, SG-c)

589-Q. Nickel-Alloyed Brass and Bronze Castings. James S. Vanick. *Foundry*, v. 78, Aug. 1950, p. 86-89, 192-193.

Graphs show effects of various percentages of Ni on mechanical properties and grain structure of different brasses and bronzes. Tables show compositions and mechanical properties of common constructional bronzes alloyed with small amounts of Ni. Typical applications. (Q general, M27, Cu)

590-Q. An Unbonded Strain Gauge. S. Baxter and H. A. Vodden. *Journal of Scientific Instruments*, v. 27, July 1950, p. 187-188.

During the development of an apparatus for measuring static stresses in rubber, attempts were made to use a conventional resistance-wire strain gage of the bonded type. Results obtained in tests lasting for several hours or more were unsatisfactory because of drift in gage resistance, probably due to flow of adhesive between the gage and its supports. Unbonded gage gave satisfactory results. Typical calibration curve and nomogram for gage design. (Q25)

591-Q. Tensile Tests at Elevated Temperatures on Forged D.T.D. 364A and R.R. 59. J. McKeown. *Metallurgia*, v. 42, July 1950, p. 92-96.

Data on these Al alloys (compositions given) are tabulated and graphed. (Q27, Al)

592-Q. Adhesion of Solids and the Effect of Surface Films. J. S. McFarlane and D. Tabor. *Proceedings of the Royal Society*, ser. A, v. 202, July 7, 1950, p. 224-243.

Experiments show that, with clean, hard metal surfaces in dry air, adhesion is negligibly small. In moist air appreciable adhesion may be observed, due to the surface tension of a thin film of adsorbed water. Absence of adhesion is due to the released elastic stresses which break the metallic junctions one by one, as the load is removed. With very soft metals, such as lead or indium, marked adhesion is observed in air. This adhesion provides direct evidence for the formation of metallic junctions by cold or pressure welding at the points of contact. If the surfaces are covered with oxide films or lubricant films of appreciable thickness, metallic interaction is diminished with a corresponding reduction in adhesion. In general, those materials which are most effective in reducing adhesion are also most effective, as boundary lubricants, in reducing friction. 27 ref. (Q9)

593-Q. Relation Between Friction and Adhesion. J. S. McFarlane and D. Tabor. *Proceedings of the Royal Society*, ser. A, v. 202, July 7, 1950, p. 244-253.

Simultaneous measurements were made of the friction and adhesion of steel sliding on indium in air. Results show that both normal and tangential stresses play a part in deformation of the metallic junctions formed at the interface. The detailed behavior of the junctions during the early stages of the sliding process may be expressed quantitatively in terms of von Mises criterion for plastic deformation under combined normal and tangential stresses, and there is good agreement between theory and experiment. Results emphasize the reality of the cold welding process which occurs at the points of intimate contact when metal surfaces are placed together. The metallic junctions so formed are responsible both for the friction and the adhesion observed. Lubricant films diminish the amount of metallic contact and so lead to a reduction in friction and adhesion. 11 ref. (Q9)

594-Q. High-Temperature Steels in Steam Plant Practice. J. Glen *Murex*

Limited Review, v. 1, no. 6, 1950, p. 106-118.

Compositions and properties of various steels. Effects of compositions and heat treatments are charted vs. mechanical properties. Future needs. 11 ref.
(Q general, T25, AY, SG-h)

595-Q. Cases of Brittle Fracture Encountered in Bridge Construction. (In French.) H. Louis. *Revue de la Soudure; Lastijdschrift*, v. 6, no. 2, 1950, p. 96-110.

Critically reviews 14 cases. Fracture location in each case indicates material used, its heat treatment, type of welding electrodes used, and probable causes of failure.
(Q26, T26, CN)

596-Q. Nature of Crystals. I. Interatomic Cohesion of Metallic Crystals. (In Russian.) V. Kurbatov. *Zhurnal Obshchei Khimii* (Journal of General Chemistry), v. 20(82), June 1950, p. 945-957.

On the basis of theoretical considerations, a formula is derived for calculation of energy of interatomic cohesion in metallic crystals. Relation between this energy and hardness, electroconductivity, and position of the particular metal in the periodic system is indicated. Shows that interatomic cohesion is a value characterizing the true mechanical properties of metals.
(Q general, M26, P10)

597-Q. Yield Strength Versus Extension Under Load. A. E. Nehrenberg. *Metal Progress*, v. 58, Aug. 1950, p. 192.

By plotting the extension under load obtained from automatically recorded stress-strain diagrams against the 0.2% offset yield strength of miscellaneous grades of alloy constructional steels in various conditions of heat treatment, a linear relationship was found. This relationship is particularly useful in determining whether or not a given material conforms to its specifications. Construction of conventional stress-strain diagrams is unnecessary. (Q27)

598-Q. American and Swedish Spring Wire. Alberto Oreffice. *Metal Progress*, v. 58, Aug. 1950, p. 198.

Wires were subjected to chemical analysis and mechanical testing (especially fatigue testing) by an Italian laboratory. Results indicate that at present American wire for valve springs (quality, oil-tempered, carbon-steel wire) is comparable in quality and fatigue properties with the better Swedish wire.
(Q7, T7, CN)

599-Q. Tensile Properties of Arc-Cast Molybdenum. *Metal Progress*, v. 58, Aug. 1950, p. 200B.

Data sheet gives tensile properties, hardness, and directional properties at room temperature; and elastic constants and tensile properties at elevated temperatures.
(Q general, Mo)

600-Q. Effect of Cold Work at Low Temperature on Austenitic 18-8. W. O. Binder. *Metal Progress*, v. 58, Aug. 1950, p. 201-207.

An 18-8 valve stem, after 15 years of use in liquid-oxygen manufacture, transformed partially to martensite under the influence of service strains at low temperature (near −300° F.). This prompted a broader investigation of the effect of low-temperature straining on the impact strength of 18-8. Results showed that strains of the magnitude encountered in service can have only a minor effect.
(Q6, N8, SS)

601-Q. Measurement of Strain. M G. Corson. *Metal Progress*, v. 58, Aug. 1950. p. 232, 234, 236, 238, 240.

Detailed review of each of the 12 articles in "The Measurement of Stress and Strain in Solids", *Institute of Physics* (London), 1948. See item 9-66, 1949. (Q25)

602-Q. Heat Resistant Alloy Combines Exceptional Ductility With Good Creep Strength. *Steel*, v. 127, Aug. 21, 1950, p. 104.

Mechanical properties of new 21% Cr, 9% Ni alloy (ACI Type HF). Some applications.
(Q general, SS, SG-h)

603-Q. Ni-Hard Continues the Battle Against Abrasion. *Nickel Topics*, v. 3, Aug. 1950, p. 6-7.

Miscellaneous applications.
(Q9, Ni)

604-Q. Frictional Properties of Porous Metals Containing Molybdenum Disulphide. F. P. Bowden. *Research*, v. 3, Aug. 1950, p. 383-384.

Results using MoS_2 in sintered Cu and in sintered Mo.
(Q9, Cu, Mo, SG-c)

605-Q. The Sliding Surface. G. I. Finch. *Proceedings of the Physical Society*, v. 63, sec. A, Aug. 1, 1950, p. 785-803.

Previously abstracted from same journal, sec. B, July 1, 1950. See item 572-Q, 1950. (Q9)

606-Q. The Pure Bending of Rectangular Plates. D. G. Ashwell and E. D. Greenwood. *Engineering*, v. 170, July 21, 1950, p. 51-53; July 28, 1950, p. 76-78.

Methods for measuring bending and deformation of rectangular plates and comparing it with that predicted theoretically. Apparatus and typical results. (Q5)

607-Q. (Book) Plasticity of Crystals With Special Reference to Metals. E. Schmid and W. Boas. 353 pages. 1950. F. A. Hughes & Co., Ltd., Bath House, Piccadilly, W. 1, London, England.

A translation of the German text. Elasticity, production, and determination of orientation of crystals. Geometry of mechanisms of crystal deformation, plasticity and strength of metal and ionic crystals, theories of crystal plasticity and strength, and properties of polycrystalline materials in relation to the behavior of the single crystal. 703 ref.
(Q23, M26)

R

CORROSION

282-R. Causes and Prevention of Iron Oxide in Boilers. S. T. Powell, L. G. Von Lossberg, and J. K. Rummel. *Combustion*, v. 22, July 1950, p. 37-44.

Sources of iron oxide, and means of forestalling and minimizing corrosive conditions. 23 ref. (R4, CN)

283-R. Corrosion Resistance of Titanium Metal in a Number of Chemical Reagents. *Materials & Methods*, v. 32, July 1950, p. 75.

A table. (R5, Ti)

284-R. Corrosion of Materials of Construction Underground. I. A. Denison. *Petroleum Engineer*, v. 22, June 1950, p. D5-D8; July 1950, p. D9-D12.

See abstract of "Soil Corrosion Studies, 1946: Ferrous Metals and Alloys", *Journal of Research of the National Bureau of Standards*, item 100-R, 1950. (R8, AY)

285-R. Symposium on Thin Films. F. A. Hamm. *Analytical Chemistry*, v. 22, July 1950, p. 958-959.

Proceedings of symposium, sponsored by Armour Research Foundation, and held in Chicago, June 8-10, 1950. Aspects discussed were formation of thin films, geometry, structure, problems, and applications. Evaporation and vapor deposition of metals and dielectrics; formation of highly polished surfaces by electropolishing; effects of grain size and oxide formation on reflectivity and electrical resistivity of metals; organic films and their use in flotation; thickness-measuring instruments; and new electron microscopes.
(R2, L25, L13, P15, P17, B14, S14, M21)

286-R. The Corrosion of Steel in Estuarine Tropical Water. S. A. Main and T. H. Arnold. *Journal of the Iron and Steel Institute*, v. 165, July 1950, p. 268-278.

Corrosion of various steels in waters at Freetown, Sierra Leone, was investigated, and the results compared with exposure in ordinary tropical sea water at Takoradi on the Gold Coast. Some operative factors (e.g., molluscs, sulfate-reducing bacteria, etc.) are discussed. 10 ref.
(R4, ST)

287-R. The Corrosion of Steel. *Journal of the Iron and Steel Institute*, v. 165, July 1950, p. 287-300.

The following papers are discussed: "A Simple Form of Accelerated Atmospheric Corrosion Test", R. St. J. Preston; "A Study of the Corrosion Resistance of High-Alloy Steels to an Industrial Atmosphere", H. T. Shirley and J. E. Truman; "The Atmospheric Corrosion of Iron and Steel Wires", J. C. Hudson; "Climatic Effects on the Corrosion of Steel", J. Dearden; "The Effect of Shot-Peening Upon the Corrosion-Fatigue of a High-Carbon Steel", A. J. Gould and U. R. Evans; "Corrosion Fatigue of Steel Under Asymmetric Stress in Sea Water", A. J. Gould; "High Speed Rotor Tests of Paints for Under-Water Service", F. Wormwell, T. J. Nurse, and H. C. K. Ison; and "Electrochemical Studies of Protective Coatings on Metals: Part I. Electrode Potential Measurements on Painted Steel", F. Wormwell and D. M. Brasher. The papers were published in 1948 and 1949 issues of the *Journal*. (R general, ST)

288-R. Performance of Anti-Corrosive Compositions in Sea Water; Effect of Surface Preparation of Steel. J. C. Hudson. *Journal of the Iron and Steel Institute*, v. 165, July 1950, p. 314-334.

Results show that methods of surface preparation have a marked effect on sea-water corrosion. Recommendations for practical application, especially to ships' hulls.
(R4, L general, T22, CN)

289-R. Stainless Steels; Improved Resistance to Sulphuric Acid. *Iron and Steel*, v. 23, July 1950, p. 309-311.

Development of a steel resistant to H_2SO_4 of any concentration at temperatures up to 40° C. Corrosion resistance of various stainless compositions to H_2SO_4 is shown graphically for ranges of temperature and H_2SO_4 strength. The alloy developed contains 18% Cr. 18% Ni, 2% Cu, and 2% Mo. (R6, SS)

290-R. Studies on the Corrosion of Tin. VI. (In Japanese.) H. Endo and G. Yokoyama. *Nippon Kinzoku Gakkai-Si* (Journal of the Japan Institute of Metals), v. 13, Dec. 1949, p. 23-27.

Tin-rich binary alloys, such as Sn-Ag, Sn-As, Sn-Fe, Sn-Hg, Sn-Mg, Sn-Mn, Sn-Ni, Sn-P, Sn-S, Sn-Se and Sn-Si, were prepared and their corrodibilities in HCl, H_2SO_4 and HNO_3 solutions were tested. Results are tabulated and graphed. Experiments on anodic behavior of Sn-Bi alloys in NaCl solution were also made.
(R5, Sn)

291-R. The Intermittent Oxidation of Some Nickel-Chromium Base Alloys. B. Lustman. *Journal of Metals,* v. 188, Aug. 1950; *Transactions of the American Institute of Mining and Metallurgical Engineers,* v. 188, 1950, p. 995-996.

Addition of certain alkaline-earth and rare-earth metals to Ni-Cr-base electrical resistance alloys causes marked increase in their oxidation resistance as measured in an intermittent-oxidation test. However, the mechanism of protection is still unknown. Results indicate that the observed behavior is due to the tendency of these elements to promote internal oxidation and thus to prevent spalling of the protective oxide scale during cycles of heating and cooling. The alloys tested contained approximately 80% Ni, 20% Cr, and small amounts of other elements. (R2, Ni, SG-q)

292-R. What's Eating on the Iron Horse. *Industrial and Engineering Chemistry,* v. 42, Aug. 1950, p. 16A, 18A.

Work of the D.&R.G.W. on miscellaneous railroad corrosion problems. (R general, T23, ST)

293-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 42, Aug. 1950, p. 69A-70A.

Selection of materials of construction for contact with various concentrations of HCl under various conditions of temperature, aeration, presence of other materials, etc. (R5)

294-R. Corrosion of Enameled Tin-Plate Covers on Glass Containers. Edward F. Kohman. *Industrial and Engineering Chemistry,* v. 42, Aug. 1950, p. 1578-1581.

As manufacturers of strained baby foods shifted from the use of cans to glass containers, perforation corrosion of the covers occurred more often, regardless of the weight of the tin coat on the jar covers. This indicated a heretofore unrecognized corrosion factor involving the ability of the seal to conduct an electric current. Consequently a galvanic couple is set up with metal exposed on the inside of the jar as the anode and metal exposed outside the jar as the cathode. Corrective measures are suggested. (R1, Sn)

295-R. The Behavior of the Chromium Nickel Stainless Steels in Sulfuric Acid. George C Kiefer and William G. Renshaw. *Corrosion* (Technical Section), v. 6, Aug. 1950, p. 235-244.

Corrosion rate of four commercial types and one special type of Cr-Ni-stainless in H_2SO_4 of varying concentration from 0 to 95% at four temperatures Effect of additions of various sulfates and oxidizing agents. (R5, SS)

296-R. The Influence of Stress on Corrosion. Part I. Julius J. Harwood. *Corrosion* (Technical Section), v. 6, Aug. 1950, p. 249-259.

Effects of stress on internal structure and energy characteristics of metals in relation to their influence on corrosion reactions. The nature and importance of residual stresses and the non-homogeneity of worked metals. Recent concepts of the nature of grain boundaries Methods of protection against stress-corrosion cracking. 40 ref. (To be concluded.) (R1)

297-R. Some Aspects of the Corrosion of Tin Plate by Prunes. V. W. Vaurio. *Corrosion* (Technical Section), v. 6, Aug. 1950, p. 260-267.

Evidence indicates that, in prunes at least, tin corrodes at a constant rate without the evolution of measurable quantities of hydrogen. Hydrogen evolution in canned prunes is related directly to the solution of the iron of the steel base. Shows that tin affords cathodic protection to steel in contact with prunes. These tests indicate that porosity is not an important factor. 11 ref. (R5, Sn)

298-R. Application of Corrosion-Resisting Materials to Railroad Electrical Construction. H. F. Brown. *Corrosion* (Technical Section), v. 6, Aug. 1950, p. 268-273. (A condensation.)

Summarizes work of AAR committee on relative corrosion of ferrous and nonferrous alloys in various atmospheres (smoky and clean, sea coast, and inland) in order to determine the most economical alloys for use in overhead contact systems of electrified railways. Includes work on protective coatings. (R3, L general, T1)

299-R. Condensation of First Interim Report on Galvanic Anode Tests of Sub Committee TP-2—Galvanic Anodes for Cathodic Protection. *Corrosion* (Technical Section), v. 6, Aug. 1950, p. 274-275. (R10)

300-R. Cathodic Corrosion — Cause and Prevention. *SAE Journal,* v. 58, Aug. 1950, p. 96, 98. Based on "Cathodic Control of Corrosion" by Hiram Walker.

Mechanism of cathodic protection and how it is used for preservation of underground structures, ship hulls, steel piling, docks, heat exchangers, condensers, and pipe lines carrying sea water. (R10, Fe)

301-R. The Mechanism of Lubricating Oil Breakdown and Its Relation to Oil Corrosion. W. F. Weiland. *Scientific Monthly,* v. 71, Aug. 1950, p. 121-122.

Four methods which have been used in the author's laboratory to correlate acid-vapor temperatures with incipient corrosion. (Acid-vapor temperatures are those at which volatile acids first form.) (R7, A5)

302-R. Corrosion Control in the Lake Maracaibo Oil Fields. John H. Zauner. *World Oil,* v. 131, Aug. 1950, p. 229-230, 232, 234.

Work of Creole Petroleum Corp. Marine organisms, particularly the destructive teredo, are impartial in their tastes—attacking steel, aluminum, wood, rubber, and synthetic compounds with equal vigor. (R1)

303-R. Corrosion and Related Problems in Sea-Water Cooling and Pipe Systems in H. M. Ships. I. G. Slater, L. Kenworthy, and R. May. *Journal of the Institute of Metals,* v. 77, June 1950, p. 309-330.

Deterioration of miscellaneous component parts. Impingement attack and deposit attack were the two most prominent types of corrosion encountered. The main factors are water speeds with related eddies and turbulence, entangled air bubbles, tube obstructions, and contamination of the water. Preventive measures include selection of materials, use of protective coatings, use of different alloys in the same system, modification of design, and maintenance routine. Materials are tough-pitch Cu, deoxidized Cu, arsenical Cu, Naval brass, Cupronickel, Al brass, cast gunmetal and phosphor bronze. (R4, Cu)

304-R. The Jet-Impingement Apparatus for the Assessment of Corrosion by Moving Sea-Water. R. May and R. W. De Vere Stacpoole. *Journal of the Institute of Metals,* v. 77, June 1950, p. 331-344.

Failure of condenser-tube and seawater pipes occurs largely as a result of the corrosive-erosive action of air bubbles carried in the water stream. An apparatus which reproduces condition favorable for this type of attack. Construction of apparatus, test procedure, and evaluation of results. (R4)

305-R. Pitting Corrosion in Copper Water Pipes Caused by Films of Carbonaceous Material Produced During Manufacture. Hector S. Campbell. *Journal of the Institute of Metals,* v. 77, June 1950, p. 345-356.

A number of cases were investigated. All the samples examined were found to contain films of carbonaceous material. A close connection was found between the weight of carbon present as film and the presence or absence of pitting in 16 copper water pipes, where failure had not occurred. It was concluded that the pitting corrosion was caused by films formed from drawing lubricant residues during annealing. (R2, R7, Cu)

306-R. Concerning Corrosion Resistance of Chromium-Nickel Stainless Steels to Commercial Sulfuric Acid. (In French.) J. M. Defranoux. *Revue de Métallurgie,* v. 47, June 1950, p. 447-453; discussion, p. 454.

Results of experiments indicate the existence of a "passive" state; however, the rate of corrosion in this state is still appreciable. Resistance to corrosion of 18-8 stainless containing 2.5% Mo depends to a considerable extent on the presence of impurities in the H_2SO_4. Intentional addition of certain substances in small amounts, especially NO_3 ion, N_2O_3, Fe^{+++}, and As^{+++} makes it possible to use this stainless steel in contact with commercial H_2SO_4. (R5, SS)

307-R. Capillaries, Capillary Systems, and Capillarity. XXII/5. The Importance of the Donnan Blockage to Corrosion Protection by Polar Coatings and to Substantive Dyeing. (In German.) E. Manegold. *Kolloid Zeitschrift,* v. 116, Mar. 1950, p. 135-146.

Shows that in a capillary system of ionic-polar material, the migration of ions can be obstructed by an electrical blockage. This fact materially reduces the corrosion of metals through protective coatings and hinders the dyeing of textile fibers. 14 ref. (R10, L general)

308-R. Test Results on Underwater Coatings on Stationary Structural Steel Parts. (In German.) W. Husse. *Chemische Technik,* v. 2, Apr. 1950, p. 126-128.

Results of long-time experiments. (R4, L general, ST)

309-R. The Oxidation of Vapor-Deposited Al-Mg and Al-Ag Alloys in Vacuum. II. (In German.) A. Boettcher. *Zeitschrift für angewandte Physik,* v. 2, June 15, 1950, p. 249-251.

Studied from 350 to 900° C. and at a very low pressure in order to reveal the structure of very thin oxide films. Electron-diffraction techniques were used. Typical patterns. Application of the method to the fundamental study of corrosion and of secondary-electron emission. (R2, Mg, Al, Ag)

310-R. The Rate of Copper Corrosion in Salt Solutions. (In German.) Walter Katz. *Metalloberfläche,* v. 4, sec. A, July 1950, p. 101-104.

Results of a kinetic and thermodynamic study. (R5, Cu)

311-R. Solubility of Aluminum During Cathodic Polarization. (In Russian.) B. Kabanov and A. Zak. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, May 21, 1950, p. 531-534.

Solubility of 99.9955% Al in various alkaline solutions and using current densities of 1-10 amp. per sq. cm. was investigated. Shows curves for KOH, NaOH and LiOH. Results are subjected to theoretical analysis. (R11, Al)

312-R. Relationship Between Constitution Diagram of an Alloy and Its Tendency to Corrosion. (In Russian.) Yu. A. Klyachko and S. A. Shapiro. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 72, June 1, 1950, p. 707-709.

This relationship was studied for the Mg-Sn and Al-Mg systems. Data indicate that a definite relationship exists. Practical application. (R general, M24, Mg, Sn, Al)

313-R. Stop Accelerated Oxidation and Get Better Jet Engines. Anton De S. Brasunas and N. J. Grant. *Iron Age*, v. 166, Aug. 17, 1950, p. 85-90.

Formation of oxides of V, Bi, Mo, W, and Pb on high-temperature steel is shown to promote "accelerated oxidation", because of contamination of the original oxide phase. The corrosion product formed does not act as a barrier to continued attack. Test samples are illustrated following high-temperature air oxidation. Optimum compositions for minimizing attack; effects of external contaminations. 15 ref. (R2, SS, SG-g, h)

314-R. Aluminum Decreases Corrosion Resistance of Austenitic Stainless. R. W. Stewart and S. F. Urban. *Iron Age*, v. 166, Aug. 17, 1950, p. 91-95.

Presence of sigma phase, rather than chromium carbide precipitation, is responsible for the low corrosion resistance of Ti-stabilized austenitic stainless steels in boiling 65% HNO_3 when tested after sensitizing treatment. The quantity of sigma can be minimized by rather close control of Al, Cr, and Ni contents. (R5, N8, SS)

315-R. Stress Corrosion. *Metal Progress*, v. 58, Aug. 1950, p. 240, 242, 244. Translated and condensed from "The Effect of Atmospheric Exposure on the Stress Corrosion of Aluminum Alloys", Gerhard Schikorr and Gunter Wassermann.

Previously abstracted from *Zeitschrift für Metallkunde*. See item 6D-27, 1949. (R1, Al)

316-R. Stress-Corrosion Resistance of Wrought Magnesium Alloys. *Technical News Bulletin* (National Bureau of Standards), v. 34, Aug. 1950, p. 108-110.

See abstract of paper by Hugh L. Logan and Harold Hessing, *Journal of Research of the National Bureau of Standards*, item 175-R, 1950. (R1, Mg)

317-R. Do Atmospheric Conditions Affect Magnesium? *Magazine of Magnesium*, Aug. 1950, p. 2-5.

A number of practical applications of bare Mg which show that it is not subject to atmospheric corrosion to any extent. (R3, Mg)

318-R. Magnesium Anodes and Common Sense. Marshall E. Parker. *Petroleum Engineer*, v. 22, Aug. 1950, p. D24-D26.

How use of Mg as source of electrical energy can lessen and sometimes eliminate corrosion. (R10, Mg)

319-R. The Fundamentals of Galvanic Corrosion. A. B. Lauderbaugh. *Oil and Gas Journal*, v. 49, Aug. 17, 1950, p. 97-98, 101-102, 107.

An elementary explanation, including schematic diagrams. (R1)

320-R. The Action of Boiling Distilled Water on Aluminium. J. M. Bryan. *Journal of the Society of Chemical Industry*, v. 69, June 1950, p. 169-173.

Al and Al alloys react initially with boiling water with the evolution of hydrogen, but the action is quickly arrested by formation of a highly resistant film of alumina monohydrate. Impurities and alloying elements in the metal and emery treatment of the surface have some influence on the reaction, but the most important factor in preventing corrosion from continuing indefinitely appears to be the presence of a certain minimum quantity of Si in the metal. (R4, Al)

321-R. Corrosion Testing. T. P. Hoar. *Journal of the Birmingham Metallurgical Society*, v. 30, June 1950, p. 63-72.

Objects of corrosion testing; properties measured in corrosion testing; and special techniques in common use. (R11)

S

INSPECTION AND CONTROL

296-S. Why Industry Misses Atom Opportunities. *Modern Industry*, v. 20, July 15, 1950, p. 48-51.

Indicates why many companies which could use radioisotopes in research and production fail to do so. Typical uses, equipment and procedures, and safety precautions. (S19)

297-S. Low-Cost Inspection Method Finds Metal Surface Flaws. *Steel*, v. 127, July 24, 1950, p. 68, 70.

Dye-penetrant technique which employs inexpensive, portable equipment to detect minute surface openings in ferrous and nonferrous metals. (S13)

298-S. The Defective Part Stays on Receiving Dock Due to New Testing Plan at Byron-Jackson Plant. *Western Metals*, v. 8, July 1950, p. 31-32.

Use of Dy-Chek inspection process. (S13)

299-S. Problem of Decarburization in Railroad Materials. Ray McBrian. *Metal Progress*, v. 58, July 1950, p. 51-54.

Argues that producers of railroad equipment are not taking proper precautions to avoid or allow for decarburized surfaces in as-rolled or as-forged metal. Photomicrographs show decarburization of four standard rails, showing wide variation of American production. Typical failures and fatigue cracks in rails are illustrated. Concludes that decarburization is responsible for most fatigue failures. (S21, J28, Q7, T23, CN)

300-S. Exposures for Cobalt-60 Radiography of Steel. A. Morrison. *Metal Progress*, v. 58, July 1950, p. 80B.

Charts are reprinted from article in *Nucleonics*. See item 8-S, 1950. (S19, S13, ST)

301-S. Induction Unit Speeds Carbon Analysis. E. R. Millen and R. M. Vredenburg *Iron Age*, v. 166, July 27, 1950, p. 68-72.

How carbon contents of steel, cast irons, and other ferrous alloys in the range 0.05-3.0% can be determined rapidly with a high-frequency induction-heated instrument. Completely automatic unit operates successfully for both gravimetric and volumetric analyses. (S11, ST, CI)

302-S. Materials Problems in Production Solved With Microscope. R. Wachtell. *Materials & Methods*, v. 32, July 1950, p. 49-51.

Series of case histories showing value of the microscope as a trouble-shooting tool. (S13, M21, M23)

303-S. Apply Radioisotope—Cobalt 60—to Radiography of Castings. Herbert R. Isenburger. *American Foundryman*, v. 18, July 1950, p. 48-49.

Procedures. Includes direct-reading exposure chart for gamma radiography. (S19)

304-S. Turbine Blade Contours Checked in Seconds. *Steel*, v. 127, July 31, 1950, p. 66.

Instrument indicates accuracy of 18 points at once and is designed to handle a variety of blade designs and dimensions. (S14)

305-S. Magnetic Particle Inspection; the 1949 Lester Lecture. L. A. Danse. *Non-Destructive Testing*, v. 8, Spring 1950, p. 7-12.

Development, procedures, equipment, and applications. (S13)

306-S. Current Applications of Magnetic Analysis Inspection. V. L. Spoley. *Non-Destructive Testing*, v. 8, Spring 1950, p. 20-23.

Equipment and procedures. Micrographs show typical structures revealed. (S13)

307-S. Ultrasonics and Their Use for Non-Destructive Testing of Materials. (Concluded.) N. G. Neuweiler. *Microtecnic*, v. 4, Mar.-Apr. 1950, p. 60-66.

Basic operating principles of the Hughes ultrasonic flaw detector, as well as the actual equipment, including the filter system. Typical results on steel forgings. (S13, ST)

308-S. The E.M.F.-Temperature Calibration of Platinum, 10% Rhodium-Platinum and Platinum, 13% Rhodium-Platinum Thermocouples Over the Temperature Range 0°-1,760° C. C. R. Barber. *Proceedings of the Physical Society*, v. 63, sec. B, July 1, 1950, p. 492-503.

Tables are based on the calibration of 12 thermocouples of each kind, 6 from each of two manufacturers. Each set of 6 thermocouples comprised 2 samples from each of 3 batches of wire. (S16)

309-S. Graphical Estimation of Inspection Errors. F. Levi. *Engineer*, v. 190, July 7, 1950, p. 2-5.

Effect of this possible error is examined in conjunction with some inspection procedures designed to screen faulty articles from controlled productions of a particular type. The approximate percentage of faulty articles accepted and of satisfactory articles rejected by a given inspection procedure is estimated graphically. (S12)

310-S. Contour and Profile Investigation. Part II. Work-Holding Devices; Comparator Equipment and Special-Purpose Optical Apparatus for Dual Projection. III. Epidiascope-Type Filing Projector; Checking Fir-Tree Roots. *Aircraft Production*, v. 12, June 1950, p. 192-197; July 1950, p. 232-234.

Techniques and equipment developed at D. Napier and Son, Ltd., for inspection of gas-turbine blades and similar work. (S15)

311-S. Experiences in the Application of Spectrographic Analysis in the Grey-Iron Foundry. E. J. Ronnie and M. M. Hallett. *Institute of British Foundrymen*, Paper No. 965, 1950, 7 pages (Advance Copy).

Applicability, equipment, organization of work, and cost. Preparation of sample, sparking technique, photographing processing technique, plate calibration, accuracy, analysis of high-alloy and pig irons, and special applications. (S11, CI)

312-S. Polarographic Analysis in Metallurgy. (In Italian.) Giovanni Semerano. *Metallurgia Italiana*, v. 42, Apr. 1950, p. 121-128.

The various quantitative methods, with special attention to a recently developed one, giving limits of precision and applicability. Various cases for which polarography has been shown to be particularly suited: analysis of metals and alloys; analysis of protective coatings; and study of corrosion. 101 ref. (S11, R11)

313-S. Localization of Defects by Means of X-Rays. (In Italian.) Francesco Baldi. *Metallurgia Italiana,* v. 42, Apr. 1950, p. 133-136.

Method based on use of two radiographs on separate films. 13 ref. (S13)

314-S. Determination of the Quality of Heat Treatment of Steel by an Electroinductive Method. (In Czech.) Adolf Pokorny. *Hutnické Listy,* v. 5, May 1950, p. 185-196.

Tool and high speed steels show characteristic hysteresis loop shapes, which vary with composition and heat treatment. By means of 180 different examples (complete details of composition and heat treatment given for each; and hysteresis loops reproduced photographically), means for determining quality of heat treatment and compositional variations are indicated. (S general, J general, TS)

315-S. Determination of Sulfur in Iron and Steel. (In Japanese.) T. Inoue. *Journal of the Casting Institute of Japan,* v. 21, no. 8, 1949, p. 9-14.

Experimental investigation of the sulfur-print method, using different grades of photographic paper and different printing methods. (S11, Fe)

316-S. Open Hearth Bath Temperature Measurement and Control. J. A. Creighton. *Journal of Metals,* v. 188, Aug. 1950, p. 980-981.

Pyrometric practice using thermocouples for measurement of molten metal temperatures at Bethlehem Steel Co.'s Lackawanna plant. Use of the system is believed to have improved mold life, stool life, pouring practice, and steel quality. (S16, D2, ST)

317-S. Ultrasonics Determine Life of Diesel Engine Crankshaft. *Iron Age,* v. 166, Aug. 3, 1950, p. 78. (S13, ST)

318-S. Why Machine Parts Fail. Part 4. Fatigue Fractures. Charles Lipson. *Machine Design,* v. 22, Aug. 1950, p. 157-160.

Several basic fracture patterns which can often be recognized. How to identify them and to determine the type of loading or defect responsible for the particular failure. (S21, Q7)

319-S. New Inspection Technique Developed. Thomas A. Dickinson. *Steel Processing,* v. 36, July 1950, p. 351, 369.

Dye-penetrant or "Dy-Chek" method developed by Northrop Aircraft, Hawthorne, Calif. (S13)

320-S. Recording Surface Finish and Wear of Gear Teeth. J. W. Sawyer and J. G. McCubbin. *Machinery* (American), v. 56, Aug. 1950, p. 135-142.

Various methods used for studying roughness and progressive wear of gear teeth—their relative merits and limitations. (S15, Q9)

321-S. Turbine-Blade Contours Rapidly Checked With Air Gage. *Machinery* (American), v.56, Aug. 1950, p. 143.

Production-line device. (S14)

322-S. Dye Method of Finding Surface Flaws in Metal Parts. *Machinery* (American), v. 56, Aug. 1950, p. 171-172.

Method developed by Turbodyne Corp., a subsidiary of Northrop Aircraft. (S13)

323-S. Surface Finish Control. C. R. Lewis. *Product Engineering,* v. 21, Aug. 1950, p. 91-95.

Realistic approach to the old problem of surface-finish specification, including a discussion of new SAE standards and of various effects below the surface of metals caused by different finishing operations. (S15, L general)

324-S. Surface Finish Definitions and Standards. *Product Engineering,* v. 21, Aug. 1950, p. 163, 165, 167.

Based on surface finish section of the new SAE Automotive Drafting Standards. (S15)

325-S. Metal Specifications for the Brass and Bronze Foundry. James G. Dick. *Canadian Metals,* v. 13, July 1950, p. 24, 26-29, 46.

Specifications developed by Canadian Bronze Co. Ltd., Montreal, Canada. (S22, E general, Cu)

326-S. That Specification: Master or Servant? With Particular Examples From the Cold-Rolled Non-Ferrous Industry. Thomas B. Crow. *Metallurgia,* v. 42, June 1950, p. 14-17; July 1950, p. 59-63.

Discusses "the specification habit" —slavish adherence to specifications without consideration of possible extenuating factors. Relation of the specification to the job, ambiguity of temper designations, American practice, and specially compiled specifications. Some B.S.I. specifications. (S22)

327-S. Density of Radiographs. *Foundry Trade Journal,* v. 89, July 20, 1950, p. 69-71.

With particular reference to the use of radiography in the nondestructive testing of castings. (S13)

328-S. Surface Defects Encountered in "Watchmaker's" Brass. (In French.) J. Hérenguel. *Revue de Métallurgie,* v. 47, June 1950, p. 455-464.

A laboratory study to determine the exact nature of such defects and their causes. Several types of brass commonly used in the watch industry were investigated. Macrographs and micrographs illustrate types of defects encountered and their microstructure. (S13, M27, Cu)

329-S. Application of Immersion Pyrometers in French Steel Works. (In French.) G. Husson and P. Rodicq. *Revue de Métallurgie,* v. 47, June 1950, p. 477-484.

Use for temperature measurement of molten steel. Apparatus and typical results. (S16, ST)

330-S. Metallic Temperature Indicating Bodies for Controlling Maximum Temperatures in Ceramic Kilns. (In German.) K. W. Fröhlich. *Berichte der Deutschen Keramischen Gesellschaft e.V. und des Vereins Deutscher Emailfachleute e.v.,* v. 27, Jan.-Feb. 1950, p. 17-23.

Commonly used methods of measuring and controlling temperatures. Use of metal blocks which, depending on composition, soften and melt, like Seger cones, at specific temperatures. Compositions are not given. (S16)

331-S. Domestic Research on Surface Quality. (In Russian.) P. E. D'yachenko. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 4-9.

The standardization of surface quality of metals, and the significance of the designations used in Russia. Difference between "roughness" and "waviness". Methods and devices for measuring surface microgeometry and ranges of applicability for several of the most widely used systems. Hardness contours are charted in and near typical metal-cutting chips still attached to the base metal. (S15, G17)

332-S. Contact-Induction Method of Measuring Linear Dimensions. (In Russian.) S. V. Rozhnov and N. N. Genchev. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, Apr. 1950, p. 12-15.

Specially designed apparatus for control of dimensions which combines the electrical-contact and inductive methods. Electric circuits are also presented for special modifications of the device for control of cylindrical dimensions and for use during polishing. (S14)

333-S. Certain Structural Defects of Micrometers. (In Russian.) G. P. Malimov. *Stanki i Instrument* (Machine Tools and Equipment), v. 21, May 1950, p. 18-20.

Causes of inaccuracy of micrometers and suggested means of minimizing it. Probable range of accuracy for various types of materials and basic shapes. An extra attachment enables the spindle to achieve backward and forward movement without backlash. (S14)

334-S. Causes of Tool Failures. I. Mechanical Factors, J. Y. Riedel. *Metal Progress,* v. 58, Aug. 1950, p. 171-175.

Factors related to design, mechanical processing, and service loads. Failures due to steel defects, to grinding checks, to heat checks, to rapid wear, and to premature breakage. (S21, Q general, TS)

335-S. Precision Thermostat for High Temperatures. *Technical News Bulletin* (National Bureau of Standards), v. 34, Aug. 1950, p. 105-107.

Thermostat which provides smooth, continuous control of an electric furnace within a very small range at temperatures between 1000 and 1550° C. The furnace winding itself serves as the sensitive element, forming part of a bridge circuit for control of a thyratron tube. The thyratron circuit then acts as a continuously variable valve. (S16)

336-S. Spectrographic Analysis in the Grey-Iron Foundry. E. J. Ronnie and M. M. Hallett. *Foundry Trade Journal,* v. 89, Aug. 3, 1950, p. 115-121; discussion, p. 121-123.

Practical experiences during the last two years. (S11, E general, CI)

337-S. Measuring of Small and Smallest Holes; Two New Measuring Methods. Rudolf Lehmann. *Microtecnic,* v. 4, Mar.-Apr. 1950, p. 97-106. Translated from the German.

Various gaging methods, especially for diameters below 2 mm. (To be continued.) (S14)

338-S. (Book) **Manual of Spectroscopy.** Theodore A. Cutting. 245 pages. 1949. Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y. $6.50.

Directions for analysis of ores, minerals, alloys and inorganic chemicals. Key lines for each element have been selected and a chart is included which shows the spacing of spectral lines and their wavelengths. A chapter is devoted to the building of spectrographic instruments. (S11)

T APPLICATIONS OF METALS IN EQUIPMENT

333-T. Economics of Lower Alloy Steels for High Quality Gears. V. E. Hense, H. H. Miller, and R. B. Schenck. *Automotive Industries,* v. 103, July 15, 1950, p. 37, 78.

See abstract of "Selecting Steels and Heat Treatments for Automotive Gears," *Materials & Methods,* item 301-T, 1950. (T7, T21, J general, ST)

334-T. Aluminum Tubing for Better Paper Cores. N. J. Spelson and F. A. Rappleyea. *Paper Mill News,* v. 73, July 15, 1950, p. 86.

Development of special Al alloy for cores on which large rolls of

paper are wound in the mills. Comparative mechanical properties. (T29, Al)

335-T. Brake Drum Materials. Fred J. Walls. *SAE Quarterly Transactions,* v. 4, July 1950, p. 368-380; discussion, p. 380.

Previously abstracted from *Foundry.* See item 325-T, 1950. (T21, T24, P general, Q9)

336-T. Review of NACA Research on Materials for Gas Turbine Blades. G. Mervin Ault and G. C. Deutsch. *SAE Quarterly Transactions,* v. 4, July 1950, p. 398-409; discussion, p. 409.

See abstract of condensed version in *SAE Journal,* item 249-T, 1950. (T25, Q27, B, Ti, SG-h)

337-T. Stainless Passenger Equipment Untouched by 13 Years. *Metal Progress,* v. 58, July 1950, p. 69-70.

Inspection of Burlington Road's Denver Zephyr, the pioneering high-speed streamliner made of stainless steel trusses and sheathing, shows it to be absolutely sound after 4,500,000 miles. (T23, SS)

338-T. Heating Diesel-Powered Passenger Trains. E. A. Russell. *Metal Progress,* v. 58, July 1950, p. 71-72.

Steam generator for diesel train uses a wide variety of metals and alloys. (T23)

339-T. Good and Bad Points of Magnesium Plates Revealed Through Two Years of Experience. Ranald Savery. *Inland Printer,* v. 125, July 1950, p. 27-30.

Results of a survey of user opinion concerning photo-engraved printing plates made of the Mg alloys Dowmetal and Zomag. (T9, Mg)

340-T. Zirconium as a Material for Fractional Weights. William M. Thornton, Jr., and Edward S. Hauber. *Journal of the Franklin Institute,* v. 250, July 1950, p. 39-44.

Potential advantages. Preliminary test data show reliability. 12 ref. (T8, Zr)

341-T. Big Business Built in Five Years: Kool-Vent Aluminum Awnings. Fred L. Church. *Modern Metals,* v. 6, July 1950, p. 20-23.

Production of awnings. Includes forming of coiled strip, and finishing operations. (T10, G1, L general, Al)

342-T. Aluminum Doors Added to Robbins Line. *Modern Metals,* v. 6, July 1950, p. 23.

Al sheets are attached to wooden cores. Metal surfaces are decorated in a variety of ways. (T26, Al)

343-T. Anodized Belts and Jewelry Highlight Profitable New Field for Aluminum. *Modern Metals,* v. 6, July 1950, p. 32. (T10, Al)

344-T. Recent Industrial Gas Installations. Part II. W. A. Darrah. *Industrial Gas,* v. 29, July 1950, p. 6-9, 25, 27.

A variety of controlled-atmosphere furnaces for metallurgical and non-metallurgical processing. (T5)

345-T. Materials at Work. *Materials & Methods,* v. 32, July 1950, p. 68-70.

Includes the following: aluminum boat, lightweight-alloy generator, stainless steel compressor blades, all-aluminum fryer. (T general, Al, SS)

346-T. Zirconium in the Operating Room. J. I. Bates. *Foote Prints,* v. 22, no. 1, 1950, p. 5-9.

Comparative mechanical properties and corrosion resistance of Zr, Ta, and 18-8-SMO stainless. Outlines various surgical applications. (T10, Zr, Ta, SS)

347-T. Acicular Cast Iron in Textile Machinery. *Nickel Bulletin,* v. 23, May 1950, p. 78-80.

Construction of automatic looms, especially the picking mechanism. Ni-Mo acicular cast iron has been in use by a Belgian firm for some time for the picking shaft and components. As a result service failures have been practically eliminated. (T29, CI)

348-T. Lighter and Brighter Metals Find Increasing Application for Architectural Metalwork. Charles R. Fleishman. *Western Metals,* v. 8, July 1950, p. 17-18.

Architectural uses of Al, stainless steel, bronze, and nickel silver. (T26, Al, SS, Cu)

349-T. Recuperators for Small Industrial Furnaces. W. Trinks. *Industrial Heating,* v. 17, July 1950, p. 1182, 1184, 1186.

The "Thermobloc" recuperator developed in England during World War II was designed to produce a high flame temperature from lean gases, not for fuel economy. (T5)

350-T. Lightweight Turbine Generator Rotors. T. De Koning. *Electrical Engineering,* v. 69, Aug. 1950, p. 694.

Al and Mg alloys are used since they have high strength in relation to weight as well as good heat and electrical conductivity, weldability, damping capacity, and protective surfaces. (T25, Al, Mg)

351-T. Waldean Cow House. *Light Metals,* v. 13, July 1950, p. 386-387.

Use of Al alloy panels and structural members. (T26, Al)

352-T. The Telescopic Gangway. *Light Metals,* v. 13, July 1950, p. 388-391; *Metal Industry,* v. 77, July 7, 1950, p. 7-8.

Use of Al alloys in docking facilities for the "Queen" vessels of the Cunard White Star Line. (T22, Al)

353-T. Dome of Discovery. *Light Metals,* v. 13, July 1950, p. 392-394; *Engineering,* v. 170, July 7, 1950, p. 10-11.

Dome now under construction is said to be the largest dome in the world and by far the largest single structure ever to be built of aluminum. (T26, Al)

354-T. Aluminium in Stagecraft. *Light Metals,* v. 13, July 1950, p. 403-405.

Various applications to stage settings. (T9, Al)

355-T. Chelsea Show, 1950. *Light Metals,* v. 13, July 1950, p. 406-409.

Use of Al alloys in greenhouse construction. (T26, Al)

356-T. Aluminium and Lighting. J. W. Morse. *Light Metals,* v. 13, July 1950, p. 357-361.

Various applications. (T1, Al)

357-T. Light-Alloy Barge. *Light Metals,* v. 13, July 1950, p. 374-376.

Barge in use on the London river. (T22, Al)

358-T. Hoover F.H.P. Motor; Design for Production in Aluminium. *Light Metals,* v. 13, July 1950, p. 377-379.

Fractional horse-power motors made by Hoover, Ltd., in England. (T1, Al)

359-T. Metal Crucibles for Melting Aluminium Alloys. Jean Duport. *Foundry Trade Journal,* v. 89, July 13, 1950, p. 45-48. Translated and condensed.

Previously abstracted from *Fonderie.* See item 322-T, 1950. (T5, E10, Fe, Al)

360-T. Ductile Iron for Heavy Machinery. C. D. Galloway, III. *Iron Age,* v. 166, Aug. 3, 1950, p. 75-78.

Ductile iron is being used for machinery castings weighing up to 30 tons. Composition and heat treatment are keys to the broad range of properties obtainable. Oscillograph recordings of special vibration dampening tests illustrate how this versatile material fills the gap between cast iron and cast steel. Patterns built for cast iron can be used. (T5, Q8, CI)

361-T. Where There's Smoke. *Die Castings,* v. 8, Aug. 1950, p. 19-20, 55-56.

Floor-stand ash trays are made of Al and Zn die castings with an Al-tube connecting the base and the ash-tray proper. (T10, Al, Zn)

362-T. Six-Shot Mechanism Uses Built-In Cams and Detents. *Die Castings,* v. 8, Aug. 1950, p. 23, 61.

Use of Zn and brass die castings above mechanism on target-model air pistol. (T2, Zn)

363-T. "Home Made" Ball Bearing With Die Cast Race. *Die Castings,* v. 8, Aug. 1950, p. 24-27, 55.

Bearing arrangement made up of a steel band and hardened, ground-steel balls mounted in a die-cast Al base not only simplifies design, but also eliminates need for expensive bearings in television-antenna rotator and holder. (T7, Al)

364-T. "Filling the Bill". *Die Castings,* v. 8, Aug. 1950, p. 28-30, 60.

Use of Zn and brass die castings in gasoline-hose nozzle valves resulted in substantial cost savings. (T7, Zn, Cu)

365-T. Exposure to Salt Water Proves Life of Die Cast Aluminum. *Die Castings,* v. 8, Aug. 1950, p. 32-34, 62.

Use of die-cast Al for cabin-cruiser fittings. Stainless steel trim also gave satisfactory service. Cr plated, sand-cast brass had given unsatisfactory results. (T6, R4, Al, SS)

366-T. Working Surfaces for Radiochemical Laboratories; Glass, Stainless Steel, and Lead. Paul C. Tompkins and Oscar M. Bizzell. *Industrial and Engineering Chemistry,* v. 42, Aug. 1950, p. 1469-1475.

A systematic attempt was made to develop simple tests which permit comparisons between surfaces, decontamination reagents, and contaminating conditions. The data are reported in terms of two newly defined quantities called decontamination index and spill index. Conclusions regarding suitability of glass, stainless steel, and lead for radiochemical laboratory surfaces are drawn, and a schedule for safe operation at various levels of activity is presented. (T29, S19, SS, Pb)

367-T. Aircraft Exhaust Valves & Seats. A. L. Pomeroy. *SAE Journal,* v. 58, Aug. 1950, p. 33-34.

Summarizes proceedings of 1950 SAE Summer Meeting round-table discussion. Problems of design, construction materials, corrosion, sodium cooling, coatings, etc. (T7, T24)

368-T. Jets Test Designers' and Metallurgists' Ingenuity. R. B. Johnson. *Iron Age,* v. 166, Aug. 10, 1950, p. 73-78.

Problems involved in design and choice of materials for jet engines. Mechanical and physical property data on alloys and components. Service failures. (T25, Q general, P general, S21, SG-h)

369-T. An Analysis of the Effect of the Life of Hardware Items of Overhead Pole Line Structures on Overall Annual Costs. Part I. Theoretical Analysis. Part II. Consideration of Methods To Extend the Life Expectancy of Mild Steel Hardware. Part III. Analysis of Cost of Applying Design Coordination Improvement to an Uncoordinated System. E. W. Oestereich. *Edison Electric Institute Bulletin,* v. 18, Aug. 1950, p. 307-316, 319.

Economic and technological analysis. Part II shows corrosion resistance and service life of various metallic coatings on steel. Relative

costs of extending life expectancy of a ⅝-in. bolt, using various methods. (T1, L general, A4)

370-T. Brake Drum Materials. (Concluded.) Fred J. Walls. *Foundry*, v. 78, Aug. 1950, p. 82-84, 118-119.
Some of the experiences of brake-drum manufacturers with various designs and metal compositions. Advantages and disadvantages of various gray-iron compositions for different types of drums. (T21, T24, Q9, CI)

371-T. Cast Heat Resistant Alloy Extends Quenched Carburizing Tray Life 80%. *Steel*, v. 127, Aug. 14, 1950, p. 105.
Use of specially modified alloys containing 35% Ni and 16% Cr or 38% Ni and 18% Cr gave 80% increase in service life over conventional alloys of the same base composition. Added elements are not disclosed. (T5, J28, SG-h)

372-T. Die Castings Simplify Meter Design. *Product Engineering*, v. 21, Aug. 1950, p. 103.
Use of nine Zn die castings in parking meter. (T8, Zn)

373-T. Stainless Steel Valve Meters Mixed Flow. *Product Engineering*, v. 21, Aug. 1950, p. 106-107.
Equipment used on beverage dispenser. (T7, SS)

374-T. Canadians Build World's First Aluminum Arch Bridge. C. J. Pimenoff. *Civil Engineering*, v. 20, Aug. 1950, p. 17-21.
Special techniques developed for fabrication and erection to meet characteristics peculiar to high-strength structural aluminum. (T26, Al)

375-T. 61S Alloy Tubing for Hydraulic Pressure Systems. G. A. Fairbairn and J. J. Sloan. *Applied Hydraulics*, v. 3, Aug. 1950, p. 24-26. (T4, Al)

376-T. Bearing Theory; Bearing Materials; Cold-Work-Hardened Tin Bronze LBz-4031. (Continued.) (In French and German.) Fr. Eckert. *Pro-Metal*, v. 3, June 1950, p. 649-653.
The principle of good lubrication and the general bearing properties of the most commonly used bronzes: LBz-4031 is claimed to consist of a pure solid-solution structure and to have, as a result, superior bearing properties. (T7, SG-c, Cu)

377-T. Commercial Uses of Magnesium in Germany. Part II. E. J. deRidder. *Modern Metals*, v. 6, July 1950, p. 27-30.
German experiments and commercial applications in buses, trucks, trailers, streetcars, and locomotives. (To be continued.) (T21, T23, Al)

378-T. Practical Aspects of Surface Decontamination. P. C. Tompkins, O. M. Bizzell, and C. D. Watson. *Nucleonics*, v. 7, Aug. 1950, p. 42-54, 87.
See abstract of "Working Surfaces for Radiochemical Laboratories; Glass, Stainless Steel, and Lead; Paints, Plastics, and Floor Materials", *Industrial and Engineering Chemistry*, item 366-T, 1950. (T29, S19, SS, Pb)

379-T. How the Use of Magnesium Extrusions Is Reducing Manufacturing Costs. *Magazine of Magnesium*, Aug. 1950, p. 8-11.
Varied examples. (T general, Mg)

380-T. Metallurgy for High-Temperature High-Sulfur Process Conditions. F. M. Fahrenwald. *Petroleum Engineer*, v. 22, Aug. 1950, p. C11-C14, C16.
The high-temperature steels, their properties, and their applications in petroleum refining. Limited to ferrous alloys containing over 14% Cr, with or without addition of Ni, and used primarily for corrosion resistance or heat resistance at temperatures of over 1000° F. (T29, SS, SG-g, h)

381-T. Current Applications of Ductile Iron Castings. *Nickel Topics*, v. 3, July 1950, p. 6-7.
Miscellaneous applications. (T general, CI)

382-T. Nickel Plating Makes Better Drums for Caustic Shipment. *Nickel Topics*, v. 3, July 1950, p. 9. (T29, Ni)

383-T. 60,000,000 Sparks From Each Electrode. *Mechanical Topics*, v. 12, no. 3, [1950], p. 4.
Use of Ni-clad Cu wire for spark plug electrodes made it possible for the plugs to be used for 243,000 miles of flying in the engine of an Eastern Airlines airplane. (T24, Ni, Cu)

384-T. Silver in Chemical Plant Construction; Some Modern Applications. *Chemical Age*, v. 63, Aug. 5, 1950, p. 196-198. (T29, Ag)

385-T. Aluminium Composites in Architecture. Joseph B. Singer. *Light Metals*, v. 13, July 1950, p. 370-373.
First of series dealing with the nature and uses of light metal integrally associated with various nonmetallic materials in building construction. Uses in combination with plastics. (To be continued.) (T26, Al)

V

MATERIALS
General Coverage of Specific Materials

150-V. More Zirconium Coming Up! *Steel*, v. 127, July 24, 1950, p. 63-64, 76.
Flow sheet for continuous process developed by Bureau of Mines for reducing anhydrous zirconium chloride with Mg under He. Present and potential uses (fluorescent lights, steel desulfurizer and deoxidizer, cast-iron graphite nodulizing agent, etc.) Heat resistance in various atmospheres. (C26, Zr)

151-V. Titanium and Its Alloys. A. E. Williams. *Mining Journal*, v. 235, July 7, 1950, p. 10-13.
Resources; methods of preparation; and uses in ferrotitanium, steel, cast iron, and nonferrous alloys. (Ti)

152-V. Properties and Uses of Thallium. H. E. Howe and A. A. Smith, Jr. *Journal of the Electrochemical Society*, v. 97, Aug. 1950, p. 167C-170C.
A review. 67 ref. (Tl)

153-V. Nodular Cast Iron. Gosta Vennerholm, H. N. Bogart, and R. B. Melmoth. *SAE Quarterly Transactions*, v. 4, July 1950, p. 422-435; discussion, p. 436-437.
Methods of making nodular iron, effect of composition on physical properties, economic factors involved, and potential applications. (CI)

154-V. A Cast Iron That Bends. Albert G. Zima. *Western Machinery and Steel World*, v. 41, July 1950, p. 74-75.
Properties and applications of nodular iron. (CI)

155-V. The Present Status of Titanium Metal. Felix B. Litton. *Foote Prints*, v. 22, no. 1, 1950, p. 10-16.
Occurrence, methods for treating ilmenite for producing titanium dioxide, titanium metal production, research activity, and mechanical and physical properties. (Ti)

156-V. Nodular Iron—A Bibliography. F. R. Morral. *American Foundryman*, v. 18, July 1950, p. 61-64.
135 references. Illustrations show nodular graphite of various types as viewed through the microscope by natural and polarized light, and as seen in the electron microscope. (CI)

157-V. Some Properties and Applications of Spheroidal-Graphite Cast Iron. A. B. Everest. *Institute of British Foundrymen*, Paper No. 963, 1950, 11 pages (Advance Copy).
Various types, their mechanical and physical properties, and applications. 11 ref. (CI)

158-V. Thermal Shock No Problem for New Metal-Ceramic. *Steel*, v. 127, Aug. 7, 1950, p. 88-89.
See abstract of "Industrial Applications of Metamics", by W. O. Sweeny, *Tool Engineer*, item 119-V, 1950. (SG-h)

159-V. Zinc Alloy as Strong as Brass. *Journal of Metals*, v. 188, Aug. 1950, p. 983.
A new alloy composed principally of Zn with small quantities of Cu and Be added, is said to have approximately the same strength and electrical properties as brass. Suggests applications. (Q23, P15, Zn)

160-V. Refractory and Wear-Resistant Parts Made From New Silicon Carbide Material. *Steel*, v. 127, Aug. 14, 1950, p. 91-92. Based on paper by C. G. Rose.
Versatile new refractory material composed of a dense network of silicon carbide embedded in a matrix of silicon which may find wide use in refractory, electrical conductivity or corrosion resistant applications. (C, SG-g, h, m, r)

161-V. Tungsten. E. L. Reed. *U. S. Atomic Energy Commission*, AECD-2700, Sept. 15, 1947, 54 pages.
Properties, fabrication, analysis, equilibrium studies with other elements and compounds, structural studies and property changes under exposure to radiation, and nuclear data. 111 ref. (W)

162-V. Spheroidal-Graphite Cast Iron; Some Properties and Applications. A. B. Everest *Foundry Trade Journal*, v. 89, July 20, 1950, p. 57-64; July 27, 1950, p. 95-97; discussion, p. 97-102.
Published figures and new data now available from practical experience with the magnesium process gained in the laboratories of Mond Nickel Co. and in their foundries. New information on some of the more specialized properties of spheroidal-graphite cast iron. Second installment deals with applications. 11 ref. (CI)

163-V. Lead Alloys. (In German.) Josef Blanderer. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 3, June 1950, p. 190-195.
Pb-Sb alloys; Pb-Sb-Sn alloys, especially type metals; Pb bearing metals and ways of improving them by adding alkali or alkaline-earth metals; solders: and production and purification. (Pb, SG-c,e,f)

164-V. German Advances in Heavy Nonferrous Metals. *Metal Progress*, v. 58, Aug. 1950, p. 220, 222, 224, 228, 230, 232. Condensed from "Nonferrous Metal Industry in Germany, 1939-1945", BIOS Report No. 23.
Based on comprehensive analysis of over 400 documents concerning activities in Cu, Pb, Zn, and associated metals. (EG-a)

165-V. Modern Cast Iron. M. M. Hallett. *Journal of the Birmingham Metallurgical Society*, v. 30, June 1950, p. 44-62.
Compositions, properties, and applications of corrosion resisting,
(Continued on page 62)

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